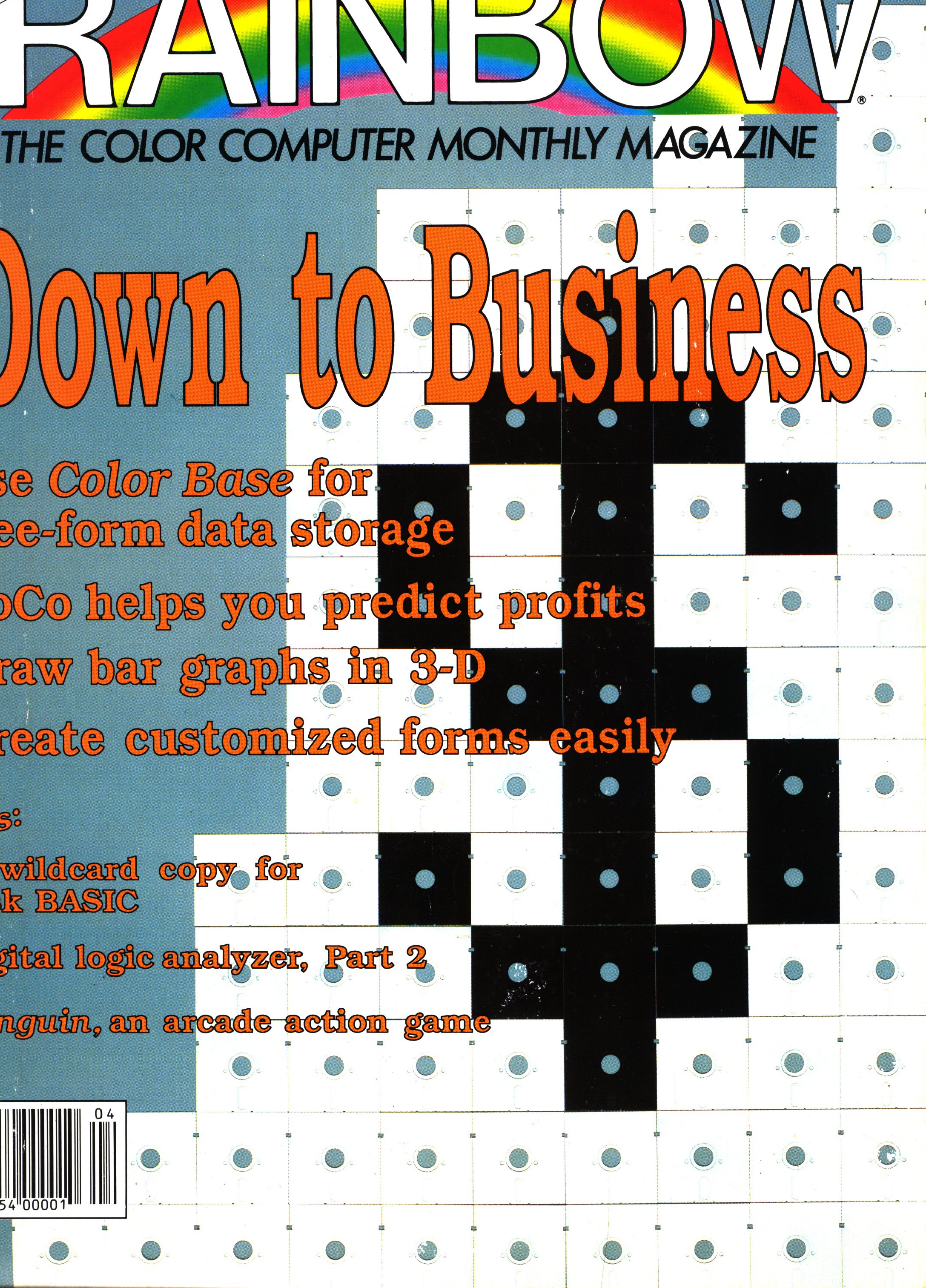


Just for your Tandy Color Computer 1, 2 and 3

April 1990

Canada $4.95 U.S. $3.95

The RAINBOW

THE COLOR COMPUTER MONTHLY MAGAZINE

Down to Business

- Use *Color Base* for free-form data storage
- CoCo helps you predict profits
- Draw bar graphs in 3-D
- Create customized forms easily

Plus:

A wildcard copy for Disk BASIC

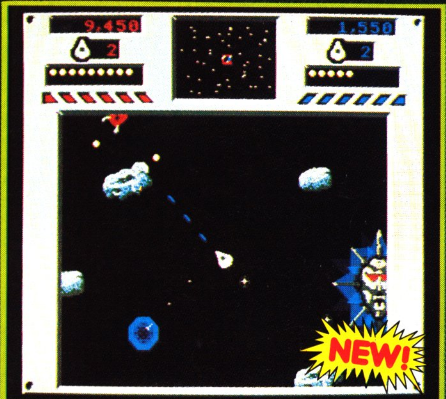
Digital logic analyzer, Part 2

Penguin, an arcade action game

0 44254 00001 04

SUNDOG SYSTEMS

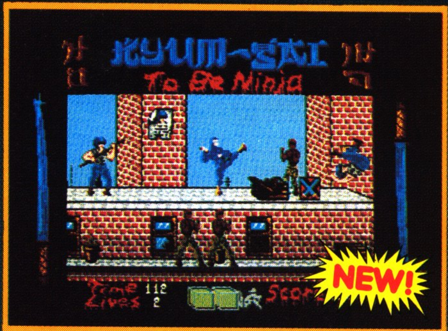
Sinistaar



Sundog Systems proudly presents the first 512K arcade game available for your CoCo III! If you don't have 512K, you will want to get it just for this game! The evil Sinistaars have invaded the galaxy and it falls to you to destroy them. These fiends will attempt to hold you with a constant barrage of drone ships while they muster their strength, and eventually find and obliterate you. Your mission is to mine the myriad asteroids in search of the precious ore which can be refined into sinibombs, your only weapon against the Sinistaars. Many surprises await as you advance through the increasingly difficult stages. Experience the fast-paced action of 512K packed with spectacular graphics, sound effects, and voices! Dozens of stages will keep you coming back for more. Req. 512K CoCo III and disk drive.

$34.95

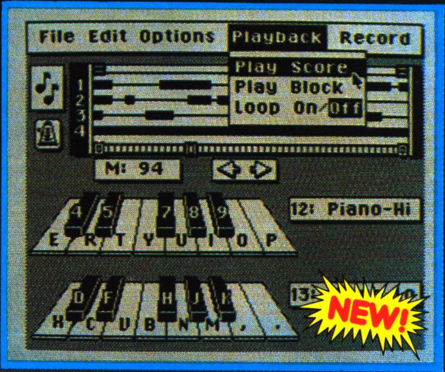
KYUM-GAI
TO BE NINJA



Something is killing off the members of the legendary order of Kyum-Gai. In desperation, its leaders have called upon the powers of the life stone to resurrect you, their greatest hero: the NINJA GAI-DAN. Now, you must find and destroy the evil forces behind this dark plot. Use a multitude of martial arts moves to defeat your enemies, obtain treasure and weapons, and evade obstacles. *Kyum-Gai: to be Ninja* uses the most detailed 320x200 resolution, 16 color graphics, the highest quality digital sound effects, and spectacular animation to bring you the greatest martial arts game your CoCo III has ever seen. Created by the author of *Warrior King*, this incredible arcade game is a definite must for your CoCo III software collection. Join the ranks of the Kyum-Gai and find out what it means to be Ninja! Req. 128K CoCo III, disk drive, and joystick (2-button joystick supported).

$29.95

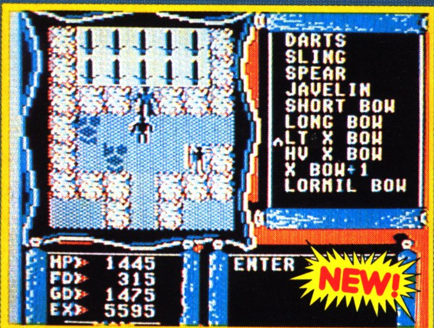
SOUNDTRAX



SoundTrax is an unprecedented sound sequencing system for the CoCo III. It requires *no* extra hardware (i.e. midi keyboards, cables, etc.). All of it is contained in your CoCo. This amazing program will read in a digitized sound and play back all of the notes in the octave in which it was recorded. And it's POLYPHONIC! You can sequence up to four voices at one time, and not only the same sound! With as many voices as can be held in your memory, depending on the song, you can create a score of up to THREE DAYS in length using drums, horns, strings, even your own voice! And you can play them all together! Using the built-in windowing point-and-click editor, you can cut, paste, even synchronize the score to just the way you like it. Use the pre-sampled sounds from the disk included, or make your own by importing them from some of the more popular digitizers available. Also, CALL for the availability of extra sound sample disks! Get it today; you won't believe your ears! Req. 128K CoCo III, mouse/joystick, and disk drive.

$34.95

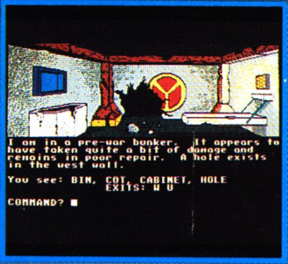
Paladin's Legacy



Years after the mysterious hero called the Paladin disappeared, loathsome creatures, spawned from the bowels of the planet, have overrun the land of Tarinth and captured the king. The situation is grave, for without the king's influence, the three nations will not unite against the growing evil. Only one pure of heart can master the five magics and thereby fulfill the Paladin's legacy and save the realm. Adventure into this vast land of fantasy, interract with its inhabitants, explore the ruinous mines, and do battle with supernatural forces. Experience the magic of the quest in this fast-paced role-playing adventure, all in the familiar quick scrolling, bird's eye play format. You will love the feeling of playing an action game with great graphics, animation, and sound effects, but all the while solving one of the most involved adventures yet. Tarinth awaits its savior! Available for all CoCo models! Req. 64K CoCo and disk drive.

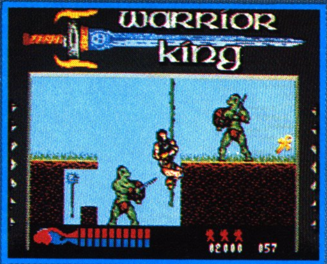
$24.95

ALSO AVAILABLE:

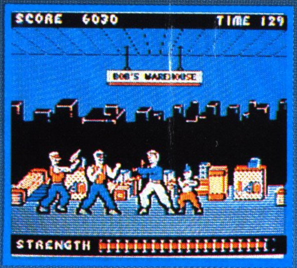


```
I am in a pre-war bunker.  It appears to
have taken quite a bit of damage and
remains in poor repair.  A hole exists
in the west wall.

You see: BIN, COT, CABINET, HOLE
         EXITS: W U

COMMAND? ■
```

In Quest of the Star Lord
128K CoCo III. $34.95
Hint Sheet: $3.95



Warrior King
128K CoCo III. $29.95



Kung-Fu Dude
64K CoCo. $24.95

- **Hall of the King I, II or III**
  $29.95 each
- **Hall of the King Trilogy**
  $74.95
- **Champion**
  $19.95
- **Dragon Blade**
  $19.95
- **White Fire of Eternity**
  $19.95.

*All require 64K CoCo.

Visa, Mastercard, Check, Money Order, and COD (USA only, please) accepted. All foreign orders must be sent in US currency Money Orders. Include $2.50 for shipping in USA and Canada. $5.00 Foreign. $3.00 extra for COD orders. PA residents add 6% sales tax. Dealer inquiries welcome. Authors: we're looking for new software!

VISA

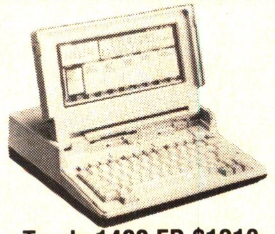
Sundog systems

MasterCard

21 Edinburg Drive • Pittsburgh, PA 15235 • 412/372-5674

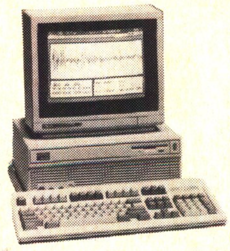
From Computer Plus to YOU . . .

PLUS after PLUS after PLUS

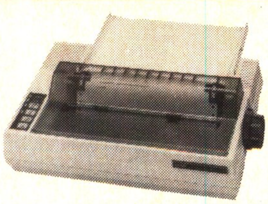


Tandy 1400 FD $1219
Tandy 102 32K $439
Tandy WP-2 $279

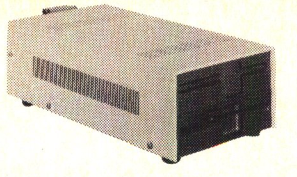
Color Computer 3
w/128K Ext. Basic $129*



Tandy 1000 SL/2 $749
Tandy 1000 TL/2 $929



DMP-133 $289



Color Computer Disk Drive
Drive 0 $179* Drive 1 $149

TandyFax $839

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 HX 1 Drive 256K	259.00*
Tandy 2500 XL 1 Drive 1 Meg	1119.00
Tandy 3000 NL 1 Drive 512K	869.00*
Tandy 2800 HD 1 Drive 1 Meg	2529.00
Tandy 1100 FD 1 Drive 640K	779.00
PRINTERS	
Radio Shack DMP-107 120 CPS	219.00
Radio Shack DMP-442 300 CPS	539.00
Radio Shack DMP-133 160 CPS	289.00
Radio Shack DWP-230 Daisy Wheel	179.00
Tandy LP-1000 Laser Printer	1499.00*
Radio Shack *DMP*-240 192 CPS	399.00
Star Micronics NX-1000 Rainbow	269.00
Panasonic KXP 1180 192 CPS	219.00*
Panasonic KXP 1191 240 CPS	259.00*
Panasonic KXP 1124 192 CPS	329.00*
Okidata 320 300 CPS	369.00
Okidata 390 270 CPS 24 Wire HD	515.00
OKI Laser 400 4PPM	999.00
MODEMS	
Radio Shack DCM-6	52.00
Radio Shack DCM-7	85.00
Practical Peripheral 1200 Baud	149.00
Practical Peripheral 2400 Baud	179.00

COLOR COMPUTER MISC.		
Radio Shack Drive Contoller		79.00*
Extended Basic Rom Kit(28 pin)		14.95
64K Ram Upgrade Kit(2 or 8 chip)		39.00
Radio Shack Deluxe Keyboard Kit		24.95
HI-RES Joystick Interface		8.95
Color Computer Deluxe Mouse		44.00
Multi Pak Pal Chip for COCO 3		14.95
COCO 3 Service Manual		29.95
Serial to Parallel Converter		59.95
Radio Shack Deluxe Joystick		13.95*
Magnavox 8515 RGB Monitor		299.00
Magnavox Green or Amber Monitor		99.00
Radio Shack CM-8 RGB Monitor		249.00
Radio Shack VM-4 Green Monitor		99.00
PBJ OK COCO 3 Upgrade Board		24.95
PBJ 512K COCO 3 Upgrade		139.00
Tandy OK COCO 3 Upgrade Board		29.95
Tandy 512K COCO 3 Upgrade		149.00
COLOR COMPUTER SOFTWARE		
	TAPE	**DISK**
The Wild West(COCO3)		25.95
Worlds Of Flight	34.95	34.95
Mustang P-51 Flight Simul.	34.95	34.95
Flight 16 Flight Simul.	34.95	34.95

COCO Util II by Mark Data		39.95
COCO Max III by Colorware		79.95
Max 10 by Colorware		79.95
AutoTerm by PXE Computing	29.95	39.95
TW-80 by Spectrum (COCO3)		39.95
TeleWriter 64	49.95	59.95
TeleWriter 128		79.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo 3 512K Super Ram Disk		19.95
Home Publishing by Tandy (CoCo3)		35.95
Sub Battle Sim. by Epyx (CoCo3)		26.95
Thexder by Sierra (CoCo3)		22.45
Kings Quest III by Sierra (CoCo3)		31.45
Flight Sim.II by SubLogic (CoCo3)		31.45
OS-9 Level II by Tandy		71.95
OS-9 Development System		89.95
Multi-View by Tandy		44.95
VIP Writer (disk only)		69.95
VIP Integrated Library (disk)		149.95

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog

***Sale prices through 4/30/90**

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (508) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

RAINBOW

Table of Contents

April 1990
Vol. IX No. 9

20

Features

12
Icarus in Search of Wings
Nick Bradbury
Here's a penguin who believes icebergs will soon be yesterday's transportation

20
Reckoning With the CoCo
Bill Minze
A program that turns the CoCo into a printing calculator

24
The Golden Retriever
Shane Messer
A free-form program that lets you create unique databases

44
Predicting Profits
David Macias
A helpful program for those planning a career in business

64
Another Form
Benjamin Brunotte
Creating forms on IBM-compatible printers

67
Show the Facts
Bryan Stephens
A 3D bar graph program for charting information

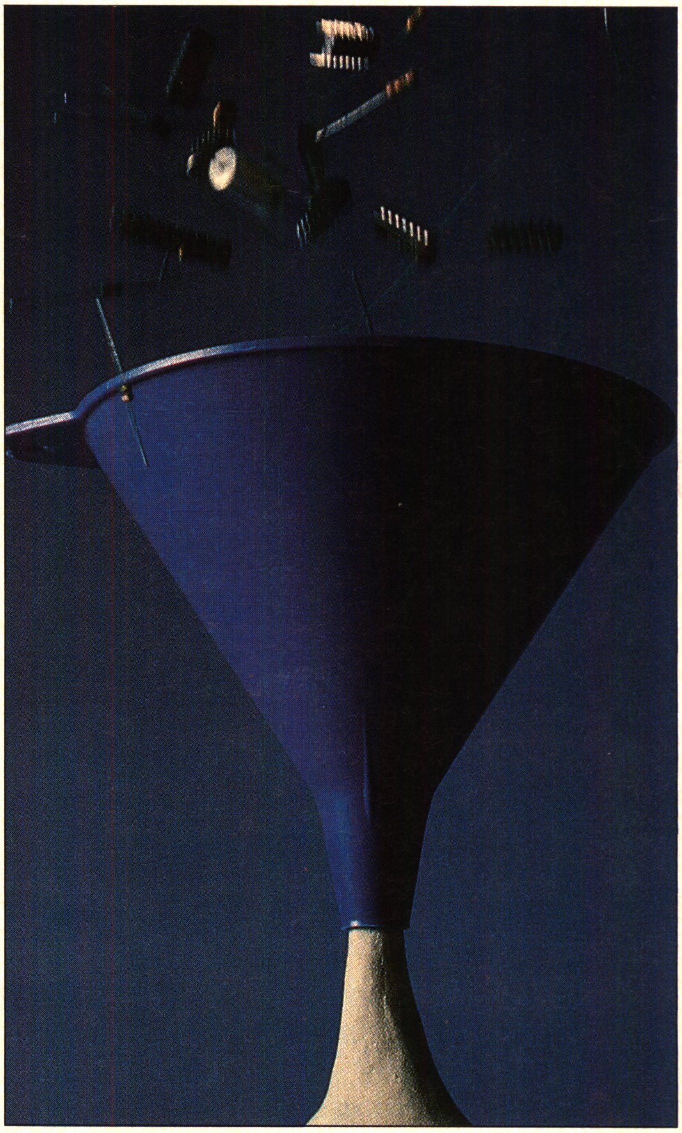
72
Completing the Analyzer Project
Dennis H. Weide
A handy tool for testing low-speed logic circuits

92
Adding a Disk Drive to Your CoCo: Part 2
Marty Goodman
A guide to adding disk drives to the CoCo

106
The File Handler
Richard Estrado
A new routine for an old chore

116
The Price is Right
Gordon E. Fouts
A program to make routine number juggling less routine

92



Columns

35
Barden's Buffer
William Barden, Jr.
Something to get your files circulating

86
BASIC Training
Joseph Kolar
More incentive to go forth and create

113
BreakPoint
Greg Law
Talking about conversions and diversions

59
CoCo Consultations
Marty Goodman, M.D.
Just what the doctor ordered

62
Database Report
Eddie Kuns
Name that tune with UltiMusE III

85
Education Notes
Steve Blyn
a, e, i, o, u

52
KISSable OS-9
Dale Puckett
A new look for OS-9

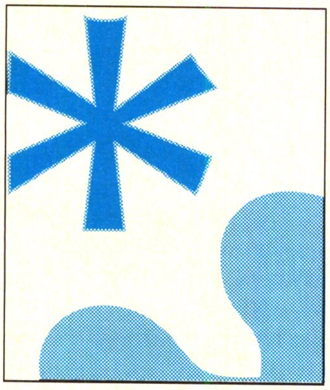
10
Print#-2
Lonnie Falk
Editor's notes

110
Turn of the Screw
Tony DiStefano
Part 3 of the digital lesson

118
Wishing Well
Fred B. Scerbo
A program that strikes a chord

124
Wrapping The Rainbow
Cray Augsburg
How many colors in a Rainbow?

"BASICally Speaking" will return next month.



106

Departments

Advertisers Index	128
CoCo Gallery	34
Letters to Rainbow	6
The Intercom	122
Racksellers	126
Received & Certified	105
Subscription Info	46

Novices Niche

48
Keeping a Tab on Your Tap
Roger E. Severs

48
And Along Came a Spider
Joseph Pendall

49
What Is on the Agenda for Today?
Kerian Kenny

50
Cutting Corners
John T. Wells

50
Steady Aim Fire
Kathy Rumpel

51
Title Screen Splashdown
Paul L. Olmstead

The cassette tape/disk symbols beside features and columns indicate the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE.

Product Reviews

Big RAM Disk/*Danosoft*	101
M-Menu System/*r3 Systems*	99
Owl-Ware's Hard Drive/*Owl-Ware*	98
Slam Bam/*Erich Sweaney*	101
Super Backup Utilities/*Carl England*	102
UltraEd+/*Supersoft*	104

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW, RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered trademarks of FALSOFT, Inc. ● Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada. ● Entire contents copyright © by FALSOFT, Inc., 1989. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. ● Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ®trademarks of the Tandy Corp. ● Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. ● Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

The Rainbow

Editor and Publisher
Lawrence C. Falk

Managing Editor Cray Augsburg
Associate Editor Sue Fomby
Copy Editor Kelly Goff
Copy Assistant Theresa Johnson
Reviews Editor Lauren Willoughby
Submissions Editor Tony Olive
Technical Editor Greg Law
Technical Assistants Ed Ellers, Gregory Shultz
Editorial Assistant Julie Hutchinson, Wendy Falk Barsky
Contributing Editors
William Barden, Jr.
Steve Blyn, Tony DiStefano
Martin Goodman, M.D.
Joseph Kolar, Dale Puckett
Fred Scerbo, Richard White
Art Director Heidi Nelson
Designers Sharon Adams, O'Neil Arnold, Teri Kays
Consulting Editors Judi Hutchinson
Typesetter Debbee Diamond

Falsoft, Inc.

President Lawrence C. Falk
General Manager Bonnie Frowenfield
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Kim Thompson
Editorial Director John Crawley
Senior Editor Jutta Kapfhammer
Director of Production Jim Cleveland
Chief Bookkeeper Diane Moore
Dealer Accounts Judy Quashnock
Asst. Gen. Manager For Administration Sandy Apple
Corporate Business Technical Director Calvin Shields
Word Processor Manager Patricia Eaton
Customer Service Manager Beverly Bearden
Customer Service Representative Carolyn Fenwick
Chief of Printing Services Melba Smith
Dispatch Tim Whelan
Business Assistant Laurie Falk
Chief of Building Security and Maintenance Lawrence Johnson
Advertising and Development Coordinator Ira Barsky
Advertising Representatives Belinda Kirby, Kim Vincent
Advertising Assistant Debbie Baxter
(502)228-4492

For RAINBOW Advertising and Marketing Office Information, see Page 128

Cover photo by Kinetic Corp.

Letters to the RAINBOW

Local Access Express

Editor:

I would like to comment on the so-called local access phone numbers. I don't know about most folks, but to me local means not dialing a 1 and area code before the number. I live in a hub of over 300,000 people where there are no local access phone numbers. The least expensive way to connect to Delphi or any other service is to call a number that is local only if you drive north for an hour. I had to give up on Delphi because it cost me $16.34 for 114 minutes of phone time. That doesn't include connect time for Delphi, which would have only cost around $14 for 2 hours.

I would like to use the services on Delphi, but I can't even use Delphi Advantage because of the phone charge for the minimum 5-hour connect time. I know other people around here with the same problem. I'm sure we're not the only ones who feel this way.

I don't know what it would take to get Tymnet or Telenet to hook up something in our area, but until someone does, the computer services and people that could be using them will be missing out on a great deal of knowledge.

Hampton Thomas
White Post, Virginia

You can send a petition to Telenet and Tymnet to get a local access node installed. While it is not always successful, both Telenet and Tymnet will look into the matter if they receive enough requests. Send your petitions to Telenet, U.S.Sprint, Inc. 12490 Sunrise Valley Drive, Reston, VA 22096; and Tymnet, P.O. Box 49019, San Jose, CA 95161-9019.

Sprucing up My Stationery

Editor:

I would like to be able to run the program *Stationery Station* (RAINBOW, January 1989, Page 106) using a Star NX-1000 printer but do not know which lines to change and how to change them.

Jerry K. Wollin
10918 W. Highland Rd.
Mequon, WI 53092

The Mystery of *Phantomgraph*

Editor:

I recently bought *Phantomgraph*, an OS-9 multiple-graph program, for my CoCo 3. I need a graphics representation for yearly sales figures on a weekly basis, so I need to include 52 pieces of information. This program has two print options, Tandy or IBM. Since I have an Epson RX-80, it should work in the IBM mode. For some mysterious reason it does not. All I get is a repetitive horizontal line. The program was written by Greg Zumwalt, so if he or someone else out there can help or suggest another program, please let me know.

J.K. Sinrod
16 Scranton Ave.
Lynbrook, New York

DeskMate 3 on a Disk

Editor:

Here is a little addition to the letter that appeared in the May '89 issue of THE RAINBOW concerning putting *DeskMate 3* on one disk.

This applies to those who have 40-track disk drives and an RGB monitor. First boot OS-9 Level 2, put your custom *DeskMate 3* disk in Drive 1, then load the `copy` and `edit` commands. Next copy the `montype` and `modpatch` commands to the commands directory of your *DeskMate* disk.

Now type `chd /d1` and press ENTER. Then type `edit startup` and type the following listing:

```
E:modpatch -s <patch
E:montype r
```

Now quit the editor. Type `edit patch` and type in the following listing:

```
E:L d0
E:C 14 00 03
E:V
E:L d1
E:C 14 00 03
E:V
```

Make sure that at the E: prompt you insert a space after the colon before you type in a line. Now quit the editor and reboot the computer. Your disk drives will run at six milliseconds, and the colors on your screen will look much better. Hint: don't be surprised if you have to go back to the Display icon to adjust the colors of the different screens under *DeskMate*.

Ernest Bazzinotti, Jr.
Dorchester, Massachussetts

Understanding the Interface

Editor:

If I wait long enough, THE RAINBOW comes through. Thanks to William Barden, Jr., I know how the Hi-Res Joystick Interface works. I had almost decided it was a $10 mistake.

There is, however, one point of confusion in the article. The CoCo does not use either a D/A converter (which would be

CIII Pages

by Walter Bayer

The *ultimate* **desktop publishing** program for the CoCo 3. Pull-down menus, icons & dialog boxes, drawing tools (create boxes, polygons, rays, circles, elipses, brush shapes), cut, copy, stamp, paste, zoom, flip, enlarge/reduce, rotate, stretch, undo, import any ASCII text, 2/3 columns & page preview. Includes 14 fonts & 60 pieces of clip art. Req. CoCo 3, RGB/ Monochrome Monitor, Min 1 drive, Tandy Hi-Res Interface, Joystick/mouse & DMP 105/106/Epson/Gemini & Compatible Printer. Only **$49.95**. w / Hires Inteface Only **$59.95.**

CoCo Graphics Designer Plus

Create beautiful greeting cards, signs and banners for holidays, birthdays and other occasions. Features easy-to-use point and click interface and user-friendly operation. Picture, font and Border collections included. Only **$29.95** (Req CoCo 2/3, disk drive, mouse or joystick, Printers: EPSON, GEMINI, Star, DMP, Panasonic KXP 1080/90/91/92, Citoh 8510, Okidata 92/93/182/183 & more)

Picture Disk #2, #3, #4: $14.95 each

Font Disk A,B: $14.95 each **Border Disk #1: $14.95**

Label Designer

Print Labels with text and graphics; mail merge option; disk directory option; easy to use interface. Only **$34.95**

Color Schematic Designer Ver 2.0

The **best Circuit Designer** for the CoCo 3. Pull Down Menus, hi-resolution symbol sets, Keyboard / Mouse / Joystick (with proportional cursor speed system), lightning fast multiple UNDOs, Symbol Add / Modify / Rotate/Line/Box Draw, Hi-res Fonts, workspace of 640 x 1000 pixels, 3 layers, font styles (fancy, italic, block, computer, etc). Supports DMP/ EPSON / GEMINI & compatible printers. Supports **near laser quality printouts** on almost all EPSON Compatibles! Only **$39.95**. CSD 1.1 / 1.2 owners can upgrade to version 2.0 by sending $10 with proof of purchase. *(See Review in September 1989 Rainbow)*

MUSIC

Musica II: Best Music Composition program for the CoCo 1,2 & 3. Disk Only **$29.95**

Lyra: MIDI Based Music Composition program for CoCo 1,2 & 3. Disk Only **$49.95**

The Lyra Companion (Book): $9.95

CoCo Midi 3 Hardware: Sophisticated MIDI sequencer / recorder. Only **$99.95**

CoCo Midi 3 Software: $59.95

Max 10: **$39.95**

Spelling Checker for Max 10:**$29.95**

Max 10 Fonts (36 fonts): **$29.95**

CoCo Max III: **$49.95**

CoCo Max III Fonts (95 fonts): **$49.95**

Max Edit (Font Editor): **$19.95**

NX1000 Rainbow Driver: **$19.95**

CGP 220 Driver: **$19.95**

CoCo Max II: **$69.95**

CoCo Max I (Tape): **$59.95**

MAXPATCH:Run Max 2 on 3. **$19.95**

VIP CALC III

Best Spreadsheet for CoCo 3. **$69.95**

VIP DATABASE III

Best Database for the CoCo 3. **$69.95**

File System Repack

A must utility for every OS9 owner. Unfragments your hard/floppy disk to speed up disk operation & reduce wear on drive heads. Only **$29.95**

CEBBS (By Kevin Berner)

Features Xmodem Up/ Downloading, menus, login, message base, clock/ calendar, execution of external programs. fullSysop control & remote system access. Even HYPERIO Compatible. Only **$49.95**. Min Req. CoCo 3, 1 Drive, & RS232 Pack.

PRINTERS

NX1000 Multifont II: $199

Panasonic KXP1180: $209

NX1000 Rainbow 9 Pin: $249

NX2400 24-pin Printer: $349

Panasonic KXP1124 Printer: $369

(Please Include $8 S&H for Printers)

Serial to Parallel Interface: $44.95

DOS

EXTENDED ADOS 3: Here it is! Highly acclaimed DOS from Spectrosystems with built-in Ramdisk & Point-and-pick & much much more. **$39.95**

Driver for Disto RTC: **$5** 28-pin Adapter: **$10**

Smartwatch RTC: **$34.95** Drivers: **$10**

ADOS 3: $39.95 **ADOS**: $27.95

Eprom Burning Service: $12 + Eprom

RGB DOS: Supports double sided drives, up to 2 hard drives & more. Epromable. **$29.95**

OS9 Hard Disk Drivers Plus Hard Disk Boot: Only **$19.95**

CoCo Util II

Transfer Basic Programs & ASCII Files between CoCo & IBM. Req DOS 3.2 or lower. Req. IBM Compatible w/ 2 drives. Only **$39.95**

Xenocopy

Allows you to format/ duplicate / read/write disks between 300 different computers; for ex. between CoCo, IBM, NEC, etc. Requires IBM Compatible w/ 2 drives. Only **$79.95**

Goldberg Utilities Volume 2

New Utilities for OS9 such as file compare, file protection, enhanced delete/move, dir. sort, dump, enhan. strip and much more. **$24.95**

Comm 4: 4 Serial Ports! Only **$124.95**

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester, NY 14618.
To Order and info on **free gift:** Refer to Page 17 of our 6-page series (Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

Credit Card Toll Free Orderline 1-800-654-5244

(9AM - 8PM 7 DAYS/WEEK)

UPS 2ND DAY AIR

Tech. Info (Between 4-8pm), Order Status, Info: 716-383-8830. **Fax:** 716-383-0026.

useless) or an A/D converter (as the Tano does), but as Mr. Barden correctly states further on, the CoCo uses a comparator circuit, which is technologically inferior (and cheaper which no doubt accounts for its use).

Also, I have a hand scanner for entering programs using OCR software. What worries me is that the scanner may not be able to handle Ben Day and color backgrounds so the OCR software can read them. I'm still working on how to get the programs from my PC/XT to the CoCo, but I believe I can whip this problem. Anything beats all that typing.

I will be renewing my subscription to your magazine, after dropping six others because they were not cost-effective for my purposes. It is the practical, down-to-earth articles such as Mr. Barden's that keep me an avid reader.

Billy R. Pogue
Lake Havasu City, Arizona

I Still Fit in With You CoCoists

Editor:

Although I am no longer a CoCo user, I enjoy reading THE RAINBOW. As the owner of an IBM PC-compatible, I can program in BASIC and C and so your magazine contains information I can use. I just want to thank you for all the help your magazine has given me.

Tim Collier
Miami

It's About Time

Editor:

I have owned a Color Computer for nine years and for the past eight years I have subscribed to THE RAINBOW. It's about time I said thank you to the staff, contributors and advertisers without whom my computer would be useless.

Radio Shack has given us a nifty little jewel, but it takes the hard work and innovation by the many programmers, hardware hackers and writers like those found in the pages of THE RAINBOW to really make our favorite computer soar!

Kevin Deneen
Rhododendron, Oregon

A Peculiar Call

Editor:

The February issue of THE RAINBOW mentioned the `SS.FD GetStt` function call. I've been using it for a while. The same function will operate with the `SetStt` call to write the file descriptor back to the disk. I've used this to change some of the contents of the file descriptor sector. The registers are used in the same manner as with `GetStt`.

Peculiarly, the `SetStt` allows changes to be made to the file owner bytes only by the super-user (user ID 0). No error occurs if another user tries to change the owner, but no change occurs either. It seems that other data can be changed by anyone with the proper access to the file.

Steve Goldberg
Bethpage, New York

Beginner's Confusion?

Editor:

I have owned a CoCo 3 for about a month and received my first RAINBOW this week. I copied several programs from your magazine but am continually having problems running them. Is this common with other beginners?

Also, why has Tandy discontinued the Multi-Pak Interface? Where can I purchase one?

William Westendorf
Bellville, Texas

You are not alone. Nearly all beginners feel frustrated and confused by the amount of information necesary to get their machines going the way they want. Hang in there and the knowledge will come. Both Howard Medical and Orion Technologies are offering Multi-Pak work-alikes.

Cry for Nintendo

Editor:

In recent issues of THE RAINBOW I've read about the CoCo receiving more games that are used with Nintendo. Although I enjoy using the CoCo for various bookkeeping and educational reasons, my two girls would like to be able to play *Super Mario Brothers* on the CoCo. Will this game be made available for the CoCo? Is there anything available now that is similar to it?

Al Parker
Olean, New York

We don't know if Super Mario Brothers *will make it to the CoCo. But if it does, you can be sure we'll get the word out.*

Looking for Multimedia Program

Editor:

I have a CoCo 3, a Multi-Pak Interface, an FD-502 and a DMP-132 printer and am looking for a program for multimedia work. Several software companies have programs for the Commodore 64 computer, which I also own, but the CoCo 3 is a much better computer and would be able to do more in this area. With such a great system as the CoCo, I can't understand why more software companies don't produce better software for this machine. Do you know if anyone makes a program like this?

THE RAINBOW is a top-notch magazine, and I hope it's around for a long time.

Eddie G. Wilson
Rt. 4 Box 198
Galax, VA 24333

Tell It Like It Is

Editor:

I was very pleased and surprised to read Jim Issel's review of *C III Pages*. I was not surprised by his honest opinion of the program, but with the fact that you printed it. Your past program reviews have been too soft. There are usually no negative remarks.

Readers realize the pressure of not stepping on the toes of advertisers, but we need to know the true impressions reviewers have of products. They should not be obligated to give favorable reviews.

J.K. Sinrod
LynBrook, New York

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

...Just think of any word processing feature, chances are Word Power has it...packs a lot of features...excellent word processor..." **Word Proc. Comparison**-April 1989 Rainbow; Pg 26.

Word Power 3.3

The Best Just Got Better!

"...friendly...amazing execution speed...much easier to use than VIP software & 2 other systems I've tried...very user friendly...highest among word-processors"-Rainbow Oct 88 Rev.

SPEED

Blazing Fast! Runs at **2 Mhz** and uses the standard text screens for lightning fast execution.

MEMORY

Word Power 3.3 allows **72K** of workspace on a 128K CoCo and **460K** on a 512K CoCo. More memory than any other word processor. Period.

DISPLAY

Choice of **40** or **80** columns with your choice of colors. Can be used with RGB/ Composite/Monochrome Monitors and TV. Pull down menus, plain english prompts, on-screen underlining and page break display make it a breeze to use!

EDITING

Powerful full-screen editor w/ word-wrap. 4-way cursor,scrolling; Line Positioning; Block Commands; Search, Replace; OOPs recall during delete, adjustable key-repeat, key-click, typeahead, Tabs, Word-Count and much more! . Built-in extensive **HELP** screen can be accessed anytime during edit.

SPOOLER

Print and Edit documents at the same time!

SORTING

Sort lists in a flash!

CALCULATOR

Built-in 4 function calculator!

2 COLUMN PRINTING

Align your text in 2 columns with a few keystrokes!

GRAPHICS

Insert **graphics** in your documents! Allows you to import PMODE 3/4, HSCREEN and CoCo Max II/III pictures!

SPLIT-SCREEN EDITING

Freeze a portion of text and edit another. Its fantastic!

MAIL MERGE

Type a letter, follow it with a list of names & addresses and have Word Power print out personalized letters. Its that easy!

SAVING / LOADING

Creates ASCII files that are compatible with other word-processors, terminal programs, etc. Allows directory point & select for easy loading/saving, **Automatic Backup**, file erase, free space display. **ARE YOU SURE?** prompts prevent accidental deletes. The **Auto-Save** feature automatically saves text to disk during user-defined intervals for peace of mind. Supports double-sided drives.

MACROS

Playback up to 250 keystrokes with a single key! Automate multiple tasks with a single key! You'll love it!

SPELLING CHECKER

Word Power 3.3 include a **80,000** word spelling checker which finds and corrects mistakes in your text.

PRINTING

Works with **all** printers that work with the CoCo. Allows options such as baud rates, spacing, page/print pause, partial print, page numbering/ placement, linefeeds, multi-line headers/footers, right justification and number of copies. The values of these options can be changed in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear on the printer. You can view margins, page breaks, justification and more.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, a/an usage, spaces and more. Its the perfect addition to any word-proccessor.

$79.95

DOCUMENTATION

Word Power 3.3 comes with a well-written instruction manual & reference card which makes writing with Word Power as easy as pie. Word Power 3.3 comes on an unprotected disk.

FREE T-SHIRT

with full order of Word Power 3.3. (Specify Size)

Upgrade Policy: Word Power 3.2 owners can get Word Power 3.3 by sending original Word Power disk and $15 to the address listed below.

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester,NY 14618

All Word Power 3.3 orders shipped by UPS 2nd Day Air at No Extra Charge in Continental US.

For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)

Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

UPS 2ND DAY AIR

A Helping Hand

Just about everyone was delighted that I was reaching awkwardly for a cigarette when I pulled my fifth spinal vertebra out. Comments such as "I told you smoking was bad for your health" were abundant.

It took a combination of *tete-a-tete* with my friendly orthopedic man, something called a *magnetic resonance image scan* (I felt like a floppy disk because they checked me several times and asked a million questions to be sure I didn't have anything that might be grabbed by their magnet) and some physical therapy to put my neck back where it was supposed to be. However, some nerves caught some place or another. This caused pain.

I returned for more therapy and some traction, assuring the therapist that I had to be in New York for one show and in Las Vegas for COMDEX. This proved to be no problem. He fitted me up with a portable traction unit that looked like a cross between a gibbet and a guillotine. I think the maid at the New York Hilton was afraid to come into the room.

I hung from this contraption two times a day for a number of weeks until gradually the nerve went back to its proper location. This relieved the chronic pain in my shoulder, my arm and my hand. Even two of my fingers quit being numb.

It was during this time, of course, that I needed to write my column. I missed it, as you may have noticed. In my attempts to work on the computer, I tried all sorts of positions and angles, but nothing helped for long. So, no column.

And not much computing, for that matter. But it got me thinking.

THE RAINBOW has printed programs (about as many as we have received) for disabled users, and I have seen a few applications over the years that have made our Color Computer accessible for the handicapped. But my experience showed me that we can do much more, as a Community, to make the power of machines like our CoCo available to more people.

While incapacitated, I found the CoCo keyboard easier to use than my MS-DOS keyboard. In fact, operating the Color Computer was easier, which may have something to do with the way the machines are set up — my CoCo disk drives are closer to the keyboard (and the whole computer), so I didn't have to reach as far.

As I began to compare the two systems in this context, I noticed that the CoCo screen in its native format is easier to read than an MS-DOS screen. And so many of the applications for the CoCo, of course, use the regular screen.

Well, I am almost back to normal now, but I'd like my experience to help others. I want to encourage you to share programs you may have written to assist the handicapped in using the CoCo. THE RAINBOW is also interested in sharing with other members of the CoCo Community whatever insights and activities you may have experienced in this area.

All can benefit from this information exchange. So please share your experiences and ideas with us and the rest of the CoCo Community.

We'll print related letters and be on an extra-sharp lookout for programs. I look forward to hearing from you.

— Lonnie Falk

Programming Secrets Galore

Pokes, Peeks and Execs are your guides into the jungle of computer programming. These commands give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information, with explanations and examples to help you immediately put it to use. Everyone from the novice to the professional will find these handy books a wealth of information.

300 POKES, PEEKS, 'N EXECS for COCO III

- *40/80 column Screen Text Dump
- *Save Text/Graphics Screen to Disk
- *Command/Functions Disables
- *Enhancements for CoCo3 BASIC
- *128K/512K RAM Test Program
- *HPRINT Character Modifier

Only $19.95

500 POKES PEEKS,'N EXECS

- *Autostart your BASIC programs
- *Disable Color BASIC/ECB/Disk BASIC commands
- *Disable Break Key/ Clear Key/ Reset Button
- *Generate a Repeat-key
- *Transfer ROMPAKs to tape
- *Set 23 different GRAPHIC modes
- *Merge two BASIC programs
- *And much much more!!!

For CoCo 1,2 and 3. Only *$16.95*

ALL 3 BOOKS for: $39.95

SUPPLEMENT TO 500 POKES,PEEKS, 'N EXECS

200 additional Pokes,Peeks and Execs (500 Pokes Peeks 'N Execs is a prerequisite)

- *ROMPAK transfer to disk
- *PAINT with 65000 styles
- *Use of 40 track single/double sided drives
- *High-speed Cassette Operation
- *Telewriter, CoCo Max enhancements
- * Graphics Dump (for DMP printers) /Text Screen Dump

For CoCo 1,2 or 3. Only *$9.95*

UNRAVELLED SERIES

An invaluable aid for Basic and Machine Language programmers, these books provide a complete disassembly and annotated listing of the BASIC/ECB and Disk ROMs. These listings give complete, uninterupted memory maps of the four ROMs. Gain complete control over all versions of the color computer.

EXTENDED COLOR BASIC UNRAVELLED: COLOR BASIC and EXTENDED BASIC ROM Disassembly: **$39.95**
DISK BASIC UNRAVELLED: DISK BASIC ROM 1.1 and 1.0 Disassembly : **$19.95**
BOTH ECB AND DISK BASIC UNRAVELLED: $49.95
SUPER EXTENDED BASIC UNRAVELLED: SUPER EXTENDED BASIC ROM Disassembly for CoCo 3. **$24.95**
COMPLETE UNRAVELLED SERIES (all 3 books): $59.95

COCO LIBRARY

CoCo 3 Service Manual: **$39.95**
CoCo 2 Service Manual: **$29.95**
Start OS9 Book + Disk: **$32.99**
Inside OS9 Level II: **$29.95**
Rainbow Guide To OS9 Level II: **$19.95**
Rainbow Guide To OS9 Level II Disk: **$19.95**
Complete Rainbow Guide To OS9: **$19.95**
Complete Rainbow Guide to OS9 2 Disks: **$29.95**
Assembly Language Programming(tepco): **$18**
Addendum For CoCo3 (tepco): **$12**
Color Computer Disk Manual: **$29.95**
Multipak Service Manual (Specify Model): **$19.95**
Disto Turn of the Screw Book: **$19.95**

Basic Prog. Tricks **$5**
CoCo 3 Secrets Revealed **$9**

GAMES

(CoCo 1,2,3 Disk unless otherwise specified; min 32K)

Warrior King (CoCo 3): $29.95
In Quest of the Star Lord(CoCo3): $34.95 **Hint Sheet:** $3.95
Hall of the King 1,2,3: $29.95 ea **Trilogy:** $74.95
Kung Fu Dude: $24.95
Dragon Blade: $19.95 **Champion:** $19.95
White Fire of Eternity: $19.95
Quest for the Spirit Stone (CoCo 3): $18
Sinistaar (512K Req): $34.95 **Kyum-Gai (CoCo 3): $29.95**
Paladin's Legacy: $24.95
Slots & Cards (CoCo 3): $39.95
Leisure Suit Larry (CoCo 3): $49.95
TREASURY PACK #1: Lunar Rover Patrol, Cubix, Declathon, Qix, Keys of Wizard & more. Only **$29.95**
TREASURY PACK #2: Lancer, Ms. Gobbler, Froggie, Madness & Minotaur, Ice Castles, Galagon, Devious. **Only $29.95**
SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows. **Only $29.95**
Defendroid: (CoCo 3): $29 **Overlord (CoCo 3): $29**

WIZARD's CASTLE: A hi-res graphics adventure game filled with tricks, traps and treasures. Min 64K. Only $19.95
Warp Fighter 3D (For CoCo 3): $24.95 **Bash** (For CoCo 3): $24.95
Mine Rescue (For CoCo 3): $24.95 **The Seventh Link:** $38
Caladuril 2: Weatherstone's End: $54
Speed Racer: Buckle your seatbelt and get ready to race in this Pole Position® type game. Only $34.95
Pinball Factory: Design, Build, Edit and Play the classic game of Pinball. Min 64K. Only $34.95
Demon Seed: Battle the diving & bloodthirsty bats. $19.95
Cashman: Explosive color, fast-moving animation and amazing sound-effects! Has over 40 levels! $29.95
Fury: An action packed airborne dogfight simulation. $29.95
Time Bandit: Fight the Evil Guardians, Killer Smurphs & more. Full animation & over 300 screens. $29.95
Rommel 3D: Exciting 3-D Tank Combat Game. CoCo 2.$34.95
Outhouse: One of the funniest, most original games. Excellent graphics, sound effects & playability. $19.95
Mudpies: Crazy circus fun! Only $29.95
Those Darn Marbles: $32 (Req 512K)

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester, NY 14618.
To Order and info **on free gift:** Refer to Page 17 of our 6-page series (Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

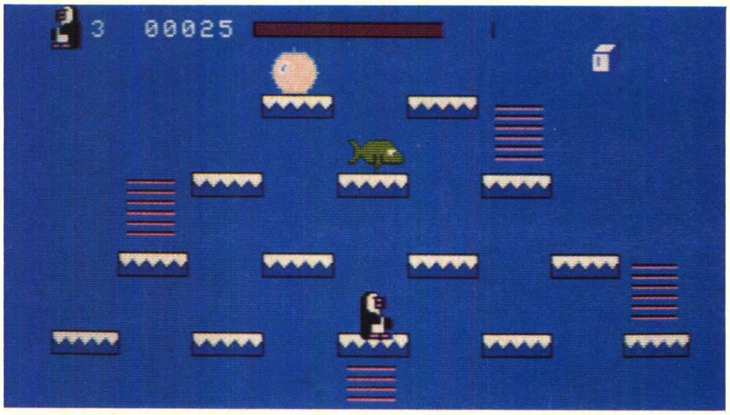
Credit Card Toll Free Orderline 1-800-654-5244
(9AM - 8PM 7 DAYS/WEEK)

UPS 2ND DAY AIR

Tech. Info (Between 4-8pm), Order Status, Info: 716-383-8830. **Fax:** 716-383-0026.

Here's a penguin who believes icebergs will soon be yesterday's transportation

Icarus in Search of Wings



by Nick Bradbury

Penguin Icarus is a unique arcade-style game for the CoCo 3. You play the role of Icarus, a thinking man's penguin who decides that life just isn't satisfactory when one is a flightless water fowl. No longer content with your useless wings, you set out on an unusual quest to find new and better ones. Every penguin, from emperor to Opus, yearns to fly.

Game Play

After selecting your monitor type, you see the title screen. Press the fire button on the right joystick to begin play.

Screen 1 is set near Icarus' Antarctic home. Using the right joystick, you must guide Icarus up a series of polar bars connected by ladders to the ice ball to be transported to the next screen. Large ice cubes fall from the top of the screen to hamper your climb. Being hit by an ice cube causes you to lose one of your penguin lives (you have four) and starts the screen over again. You can gain extra points (25) by eating the mackerel that occasionally appear above the ice bars.

Screen 2 takes Icarus into the clouds. You must guide him up through the clouds to the second glowing ice ball by climbing the ladders and riding the elevators down to each new set of clouds. This would be simple if the clouds weren't electrified — unfortunately, they are. Touching or falling off an electrified cloud will cost you a penguin life.

Screen 3 is the magical location of Icarus' new wings. You must jump your penguin along each layer of balloons without falling and then walk along the thundercloud corridor to gain your wings. Short bolts of lightning fall from these thunderclouds, so be careful not to be hit by one.

Once you have gained your wings, a short burst of Icarus' favorite song is played, and then he tries out his wings (without your help) in a pleasant nature scene. It's a shame, though, that Icarus is such a clumsy penguin.

Controlling Icarus may take some getting used to. Instead of climbing ladders Mario-style, Icarus must jump from rung to rung. (Well, think about it — how else could a penguin climb a ladder?) When he jumps, he may be moved left or right as long as he is still in the upward part of his jump. Once he starts coming down, he cannot be moved left or right until he lands on something.

The top of each screen displays the number of penguin lives remaining, the score, and a red bar representing the timer. Points are awarded depending upon how quickly each screen can be completed. Failure to complete a screen before the timer runs out ends the game.

The technique used to animate the figures in *Penguin Icarus* is a relatively simple one. All shapes are created during set-up and then saved in `HGET` buffers. Before the program places a shape onscreen during game play, the area to be occupied is saved in a separate `HGET`. When a shape is to be moved, this area is returned to the screen (via an `HPUT`). Then the area about to be occupied by the shape is saved by the same `HGET` so the process can be completed. After the area is saved, the shape can then be placed onscreen in its new location. For a demonstration of this technique, enter and run Listing 2. For further information on `HGET/HPUT`, please refer to the CoCo 3 Extended BASIC manual. ❑

Nick Bradbury, a junior in advertising at the University of Tennessee, works as a cartoonist for the daily college newspaper there. His previous CoCo works include Moon Runner *and* Legend Quest. *He can be contacted at 712 Forest View Road, Knoxville, TN 37919.*

COCO UTILITIES GALORE

(For CoCo 1,2,3 RSDOS; Min 32K Unless Otherwise Specified)

Super Tape/disk Transfer

Transfers Tape-To-Disk, Disk-to-Tape,Disk-to-Disk,Tape-To-Tape. Only **$24.95**

Maillist Pro

Add, Edit, View, Print (Select/All), Sort Mailing Labels. Only **$19.95**

Computerized Checkbook

Add, View, Search & Print Checkbook Entries for savings/ checking & other accounts. Only **$19.95**

CoCo 3 Screen Dump

32/40/80 column, PMODE 3/4 dump. Allows you to take snapshots of screens while program is running! For DMP & Epson/ Gemini/ Star & Compatibles. Only **$19.95** (CoCo 2 compatible)

RGB Patch

Displays most graphics in Color on RGB Monitors. For CoCo 3.Only **$24.95**

FKEYS III

Create up to 20 function Keys. EPROMable. For CoCo 3.Only **$19.95**

Sixdrive

Allows use of 3 double-sided drives from RSDOS or ADOS. Disk Only **$16.95**

Disk Label Maker

Design Professional labels. Allows expanded, normal, condensed text w/ Double-Strike & Borders. Supports DMP, Star, Gemini, Epson & Comp. Printers. Only **$19.95**

Disk Utility 2.1a

The best disk management program for the CoCo 2 & 3. Only **$19.95**

Bowling Score Keeper

For Team & Individuals. **$19.95**

Vcr Tape Orgranizer

Organize your videotapes.Only **$19.95**

Home Bill Manager

Organize your Bills.Only **$12.95**

Calendar Maker

Calendr & Appts. Only **$12.95**

From Cer-comp...

Window Master: Windowing Environment for CoCo 3. **$69.95** w/ HiRes: **$79.95**

Window Writer: **$59.95**

Window Basic Compiler: **$99**

Window ED/TASM: **$49.95**

Font/Icon Editors: **$19.95**

Advanced Prog. Guide: **$24.95**

CBASIC: Basic Compiler. Specify CoCo 1,2 or 3. Only **$149.95**

The Source: Best Disassembler. Specify CoCo 1,2 or 3. **$49.95**

EDT/ASM: Best Assembler. Specify CoCo 1,2,3. **$59.95**

Telewriter 64

Best Word Processor for CoCo 2. Disk: **$57.95** Cas: **$47.95**

Autoterm

Best Terminal Software. Disk: **$39.95** Cas: **$29.95**

From Dr. Preble®

Basic Freedom: **$24.95**

Vocal Freedom: **$34.95**

Mental Freedom: **$24.95**

Hacker's Pac: **$14.95**

Disk Utilities

Use all 360K from your double sided drive & more. **$17.95**

MEMORY MASTER

Run 2 programs at once, fix disks, scan, edit memory on CoCo 2. Only **$24.95**

Vterm

Terminal Software w/ VT Emulations and much more. CoCo 3 Only. Only **$39.95**

Basic Windows

By Kevin Berner

Run 6 Basic Programs at the same time! Req. 512K. **$39.95**

OS9 (New Products Added Every Month)

Window Writer

Powerful OS9 word processor with multi-tasking, pull down menus & much more. Only **$59**

DynaSpell: 102,000 word spelling checker! Only **$19.95**

RSB v1.3

The revolutionary program that allows you to use Basic under OS9 Level II to take advantage of features. Only **$39.95**

Start OS9

An excellent hands-on guide to OS9 Level II for the beginner. Req 512K, 2 Drives & Monitor. Book & Disk Only **$32.99**

From Alpha Software®

OS9 Level II BBS V3.0: The absolute best BBS program for OS9. Even comes with its own terminal Program. Req. 512K & RS232 Pack. Only **$29.95**

Level II Tools: 25 utilities such as windowing, wildcards, tree and more. Only **$24.95**

Disk Manager Tree: Change, copy, view,create directories with ease. Req 512K. **$29.95**

Warp One: Complete Level II Windowing Terminal. Req 512K & RS232 Pack. Only **$34.95**

The Zapper: Patch Disk Errors. Disk Only **$19.95**

Multi-Menu: Create your own pop-down windows. Req 512K and Multi-Vue. Only **$19.95**

Presto Partner: Have a notepad, calculator, calendar, phone book,RT clock & more at your fingertips. 512K Req. **$29.95**

From R3 Systems®

Screen Control Utility: Gain Complete control of your text screen. Only **$19.95**

Menuing Utility: Complete memory resident menuing system. Only **$19.95**

Point & Shoot File Selection: Only **$19.95**

Multi-Edit

Create, Edit Application Information Files & Icons for Multi-Vue. Only **$24.95**

Transfer Utilities

GSC File Transfer: Transfer files from MSDOS / OS9/ RSDOS & Flex. Req OS9 (Level II for Multivue Ver.),2 drives, SDISK/SDISK3. Standard Version: **$44.95.** Multivue Version: **$54.95**

SDISK3: Standard drive replacement module allows use of 40/80 DS/DD drives. Req. OS9 Level II. **$29.95** SDISK: **$29.95**

PC-Xfer Utilities: Programs to format/transfer files to/from MSDOS disks to CoCo under Level 1/2. Req SDISK(3): **$44.95**

OS9 Level II Ramdisk

In-memory disk drive! Req 512K. Disk Only **$29.95**

Goldberg Utilities

Power-packed utilities w/ 15 useful commands such as sort, lost file location, disk pack & much more. Only **$24.95**

From Burke & Burke®..

Wild & MV Version 2.1: Use "wildcards" with OS9 & re-arrange directory tree. **$19.95**

EZGen Version 1.04: Powerful OS9 bootfile editor. Changes names, add/delete modules, patch bytes, etc. **$19.95**

From Microtech®...

XWord: Best OS9 Word Processor with True character oriented & more. **$69.95**

XMerge: Mail Merge for XWord. Only **$24.95**

XSpell: 40000 word spelling checker. Only **$39.95**

XED: Full Screen Editor. **$39.95**

XDIS: Disassembler. **$34.95**

XTerm: OS9 Communications Program. Only **$49.95**

XDir & XCal: Hierarchial directory, OS9 calculator. **$24.95**

From Frank Hogg®...

Dynastar: Most Popular OS9 Word Processor. Only **$99.95**

Both Dynastar & Spell: $119.95

Wiz: Communications Program. Req RS232 Pack. **$59.95**

From Sugar Software®

OS9 Calligrapher: Only **$24.95**

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester, NY 14618.

To Order and info **on free gift:** Refer to Page 17 of our 6-page series (Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

Credit Card Toll Free Orderline 1-800-654-5244

(9AM - 8PM 7 DAYS/WEEK)

UPS 2ND DAY AIR

Tech. Info (Between 4-8pm), Order Status, Info: 716-383-8830. **Fax:** 716-383-0026.

40	5
110	252
170	0
220	113
250	192
300	65
350	24
400	51
450	195
500	171
540	54
600	218
650	40
690	41
730	8
780	16
830	102
890	36
940	79
980	107
1020	175
1050	169
1090	39
1140	96
1190	225
1240	18
1290	94
1330	166
1380	244
1410	165
1450	220
1480	4
1540	212
1590	72
1620	220
1650	111
END	51

Listing 1: PENGUIN

```
0 ' COPYRIGHT 1990 FALSOFT, INC
10 CMP:ONBRK GOTO1700:POKE65497,
0:POKE&HE6C6,0:DIMC(38),CX(20),C
Y(20),FX(16),FY(16)
20 CLS:PRINT@103,"SELECT MONITOR
 TYPE:":PRINT@135,STRING$(20,"-"
):PRINT@195,"(1) RGB   (2) COMPO
SITE/TV":PRINT:INPUTA:IFA<1ORA>2
THEN20ELSEMT=A:GOSUB760
30 HBUFF1,560:HBUFF2,133:HBUFF3,
133:HBUFF4,133:HBUFF5,91:HBUFF6,
91:HBUFF7,91:HBUFF8,380:HBUFF9,3
96:HBUFF10,720:HBUFF11,396:HBUFF
13,276:HBUFF14,156:HBUFF15,60:HB
UFF16,60:HBUFF17,450:HBUFF18,993
40 HBUFF19,201:HBUFF20,201:HBUFF
21,101:HBUFF22,101:GOSUB780
50 PLAY"V31L255T255":GOTO1610
60 JM=0:FS=0:GL=0:LC=0
70 GOSUB730
80 GOSUB710:PALETTE6,RND(63):J0=
JOYSTK(0):IFLV=0THEN90ELSEIFFS=1
THEN190ELSEIFRND(18)=1THEN180
90 XX=X:YY=Y:IFJM=0ANDHPOINT(X+6
,Y+19)=7THENJ=2:Y=Y+5ELSEIFJ0<15
THENJ=1:PN=3:X=X-8ELSEIFJ0>48THE
NJ=1:X=X+8:PN=2
100 IFJ<>2THENIFJM=1THEN240ELSEI
FBUTTON(0)=1THENJM=1:JC=1:PLAY"O
3V20DEFGO4V30CDE":GOTO240
110 IFX<12THENX=12ELSEIFX>288THE
NX=288
120 IFY>175THENY=175ELSEIFY<10TH
ENY=10
130 IFJ>0THENJ=0:HPUT(XX,YY)-(XX
+12,YY+18),4,PSET:HGET(X,Y)-(X+1
2,Y+18),4
140 HPUT(X,Y)-(X+12,Y+18),PN:IFL
V=2THEN300ELSEIFLV=3THEN530ELSEI
FLV=0THEN450
150 IFH1=1THEN260ELSEIFRND(5)=1T
HEN250ELSEFORI=1TO27:NEXTI
160 IFBB=0THENIFX<142ANDY<22THEN
220
170 GOTO80
180 FS=1:R=RND(4):FX=FX(R):FY=FY
(R):FC=0
190 HPUT(FX,FY)-(FX+29,FY+12),19
,PSET:FC=FC+1:IFFC>18THENFC=0:HP
UT(FX,FY)-(FX+29,FY+12),20,PSET:
FS=0:GOTO90
200 IFX>FX-4ANDX<FX+27ANDY>FY-20
ANDY<FY+8THENFS=0:HPUT(X,Y)-(X+1
2,Y+18),4,PSET:HPUT(FX,FY)-(FX+2
9,FY+12),20,PSET:SC=SC+25:PLAYP4
$:GOSUB730:HGET(X,Y)-(X+12,Y+18)
,4
210 GOTO90
220 TS=TM*5:SC=SC+TS:GOSUB730:HP
RINT(22,1),"BONUS":HPRINT(27,1),
TS:PLAYP2$:FORI=1TO750:NEXTI:GOS
UB1370:GOTO60
230 GOTO80
240 IFLV=2ANDY<43THENJM=0:JC=0:G
OTO110ELSEJ=3:JC=JC+1:IFJC>5THEN
JC=1:JM=0:GOTO110ELSEY=Y-5:GOTO1
10
250 H1=1:HY=0:HX=30+2*RND(117):H
GET(HX,HY)-(HX+12,HY+12),6:Z=8
260 HPUT(HX,HY)-(HX+12,HY+12),6:
HY=HY+Z+(DF*3):Z=Z+.3:IFHY>157TH
ENH1=0:PLAY"O2V20CE":GOTO160ELSE
HGET(HX,HY)-(HX+12,HY+12),6:HPUT
(HX,HY)-(HX+12,HY+12),5
270 IFHX>X-9ANDHX<X+12ANDHY>Y-8A
NDHY<Y+18THEN290
280 GOTO160
290 PLAYP1$:NP=NP-1:GOSUB730:FOR
I=1TO750:NEXTI:GOSUB1230:GOTO60
300 IFY<38THENY=38:JM=0:JC=0ELSE
IFY>172THEN430
310 IFX<42ANDY<41THENTS=TM*10:SC
=SC+TS:GOSUB730:HPRINT(22,1),"BO
NUS":HPRINT(27,1),TS:PLAYP2$:FOR
I=1TO750:NEXTI:GOSUB1450:GOTO60
320 IFX<EX(EE)+18ANDY<EY(EE)+21A
NDY>EY(EE)+4THEN380
330 '
340 CT=CT+1:IFCT<3-DF THEN360ELS
ECT=0:C=C+1:PLAY"O2G":IFC>15THEN
C=1
350 CX=CX(C-1):CY=CY(C-1):HPUT(C
X,CY)-(CX+43,CY+17),9,PSET
360 CX=CX(C):CY=CY(C):HPUT(CX,CY
)-(CX+43,CY+17),11,PSET:IFX<CX+3
8ANDX>CX-8ANDY<CY+15ANDY>CY-18TH
EN410
370 GOTO80
380 EX=EX(EE):EY=EY(EE):HGET(EX,
EY)-(EX+38,EY+35),10:EE=EE+1
390 FORI=EY TOEY+114STEP2:HPUT(E
X,I)-(EX+38,I+35),10,PSET:PLAY"O
3F":NEXTI:SC=SC+10:GOSUB730
400 Y=Y+114:GOTO330
410 NP=NP-1:HPUT(X,Y)-(X+12,Y+18
),PN:FORI=1TO18:PALETTE0,RND(63)
:PLAY"O3EO5C":NEXTI:PALETTE0,0:G
OSUB730:FORI=1TO800:NEXTI:GOSUB1
370
420 GOTO60
430 NP=NP-1:FORI=5TO1STEP-1:PLAY
"O"+STR$(I)+"FDEC":NEXTI:GOSUB73
0:FORI=1TO600:NEXTI:GOSUB1370:GO
TO60
440 J=3:JC=JC+1:IFJC>7THENJC=1:J
M=0:GOTO360ELSEY=Y-3:GOTO360
450 IFY>154THENNP=NP-1:FORI=5TO1
STEP-1:PLAY"O"+STR$(I)+"FDEC":NE
XTI:GOSUB730:FORI=1TO450:NEXTI:G
OSUB1690:GOTO60
460 IFX>259THENSC=SC+50:GOSUB730
:PLAYP2$:FORI=1TO500:NEXTI:GOSUB
1230:GOTO60
470 IFGL=1THEN500ELSEIFRND(8)=1T
HEN490
480 GOTO80
490 GL=1:GY=140:GX=262:PLAY"O3V3
1BAGFEDC"
500 HPUT(GX,GY)-(GX+12,GY+12),22
,PSET:GX=GX-8-(DF*2):IFGX<0THENG
L=0:GOTO80ELSEHPUT(GX,GY)-(GX+12
,GY+12),21,PSET
510 IFX<GX+12ANDX>GX-10ANDY<GY+1
2ANDY>GY-18THENPLAY"O1V31CDEFGO2
GFEDCDCDC":NP=NP-1:FORI=1TO600:N
EXTI:GOSUB730:GOSUB1690:GOTO60
520 GOTO80
530 IFY>172THENNP=NP-1:FORI=5TO1
STEP-1:PLAY"O"+STR$(I)+"FDEC":NE
XTI:GOSUB730:FORI=1TO600:NEXTI:G
OSUB1450:GOTO60
540 AX=20+RND(5)*40:AY=50+RND(3)
*40+RND(2)-2:HPUT(AX,AY)-(AX+23,
AY+22),13,PSET
550 IFL1=1THEN600ELSEIFRND(3)=1T
HEN580
560 IFX>242ANDY<44THEN640
570 GOTO80
580 L1=1:LY=17:PLAY"O3V28EO1A":L
C=LC+1:IFLC>10THENLC=0
590 LX=60+LC*18:HGET(LX,LY)-(LX+
5,LY+19),16
600 HPUT(LX,LY)-(LX+5,LY+19),16,
PSET:LY=LY+18+(DF*3):IFLY>192THE
NL1=0:GOTO560ELSEHGET(LX,LY)-(LX
```

DISTO PRODUCTS

All Disto Products now carry a 1-Year Warranty and are shipped **2nd Day Air** (at no extra charge!) within Continental US. All Disto Add-Ons (& Super Controller II) include OS9 Drivers, unless otherwise specified.

Disto Mini Controller (with RSDOS or CDOS) : **$74.95**
Disto Super Controller (with RSDOS or CDOS): **$99.95**
Disto Super Controller II (with RSDOS or CDOS): **$129.95**

- **Mini Eprom Programmer Add On: $54.95**
- **Hard Disk Adapter: $39.95** w/ RS232: **$69.95**
- **RT Clock & Printer Interface: $34.95** (**OS9 Driver: $19.95**)
- **3-in-1 Multiboard Adapter**: Parallel Port, RT Clock & RS232 Port. **$74.95**
- **MEB Adapter II: $34.95**
- **4-in-1 Board**: Parallel Port, RT Clock, RS232 & Hard Disk Interface: **$129.95**

RS232 Super Pack: True RS232 Port for your CoCo! Compatible with Tandy® RS232 Pack. Includes DB25 Cable. 100% Compatible with OS9 ACIA Software. Req. Multipak. Only **$54.95**

HARD DRIVES, Etc.

Systems w/ Seagate Hard Drive, Controller, Cables, CoCo XT Interface, Cables, Case (with fan & Power Supply), Software (OS9 Software & HYPERIO Software!) & Instruction Manuals. Assembled/Tested/Formatted. Just *Plug'N'Run*. Req. Multipak.

Disto Hard Drives Systems Also Available!

Seagate 20 Meg System: $509
Seagate 30 Meg System: $539

40 Meg OS9 System $599

CoCo XT: Use 2 5-120 Meg Drives with your CoCo. Only **$69.95** w/ Real Time Clock: **$99.95**
CoCo XT ROM: Boots OS9 from hard/floppy. Only **$19.95**
HYPERIO: Allows Hard Drive use with RSDOS. Only **$29.95.**
HYPERIO Disto Version. Only **$29.95**
HYPERIII: RAMDisk & Spooler to CoCo 3 HYPER I/O. **$12.95**

HYPERIO Utilities (by Kevin Berner)
Hard Drive Utilities: MSA Backup, Copy/Kill/Rename, Hard Disk Backup to Floppies (vica versa) & more. Only **$21.95**
Disk Doctor: Checks/locks out bad sectors. only **$17.95**
Hard Drive Zap: View tracks, sectors, modify data on your hard disk. Only **$21.95**

Drive 0 $199

2 Drive System $299

DRIVES

There are a lot of dealers selling disk drives for the CoCo. Why buy from us? **First**, all our drives are BRAND NEW DOUBLE SIDED Drives. They are sleek, fast (6ms!), quiet and have a reputation of superb performance and reliability. **Second**, our Drive 0 & 2 Drive Systems come with the acclaimed DISTO Controller - with gold plated contacts & built-in ROM which allows you to access BOTH sides of our drives!. **Third**, our Drive 0 & 2 Drive Systems come with the **Official** 200 page Radio Shack Disk Manual. **Fourth**, you get $50 worth of our utility software (Disk Util 2.1A & Super Tape/Disk Transfer). Our drive systems are head & shoulders above the rest!

Drive 0 (with Disto Controller, Case, Power Supply, 1 Drive Cable, Manual, Software): **$199**
Drive 1 (with Case, Power Supply & Software): **$129** Bare 5 1/4" Drive: **$89**
2 Drive System (With Disto Controller, Case, Power Supply, 2 Drive Cable, Manual & Software): **$299** Full-Height Case/Power Supply: **$59.95** Power Splitter: **$9.95**
1 Drive Cable: $16.95 **2 Drive Cable: $22.95** **4 Drive Cable: $34.95**
FD501 Upgrade Kit: Bare Drive, 2 Drive Cable & Instructions: **$109**
FD502 Upgrade Kit: Bare Drive, 2 Drive Cable, Power Cable & Instructions: **$119**
Toshiba **3 1/2" 720K Drive** w/ Power Supply & Case: **$149** 3 1/2" Bare Drive: **$99**

MAGNAVOX Monochrome 12" Monitor

Sharp 80-column display w/ built-in speaker. Includes Video & Audio Cables. Only **$99**. (Add **$8** S&H). Spec. Green/Amber.

21st Century Software

Ulti-Comm: Fantastic comm. software w/ windows, Xmodem/Ymodem, VT52/100/ 200/220 emul., 80 track nVsupport, ADOS support, Serial Port or RS232 Pack up to 9600 baud & much more. CoCo 3. **$39.95**
File Master 2.20 for CoCo 3: $69.95

Connecting CoCo to Real World Book by William Barden, Jr. : **$19.95.**

512K CoCo 3

Brand new **Color Computer 3 with 512K Installed and tested!** Comes with complete manuals and $100 worth of software!

Only $259
Please Add $10 S&H
512K Installat. Voids Warranty

More Good Stuff...

DS69B Digitizer: Use your CoCo to display pictures from your VCR. Comes complete with CSEE Software. Only **$149.95. CoCo 2 Version: $99.95**
Advanced Gravis Joystick: Features tension, rotary-centering, free floating controls with 3 buttons. Only **$59.95**
MPI Locking Plate
(Specify CoCo 2/3 and 26-3024/3124): **$8**
5 1/4" DS/DD Disks: $.40 each
5 1/4" Colored DS/DD Disks: $.89 each
3 1/2" DS/DD Disks: $1.29 each
5 1/4" Disk Case (for 70 disks): **$9.95**
3 1/2" Disk Case (for 40 disks): **$7.50**
Black Ribbon: $8.50 NX1000 Colr Rib.: $12.95

Microcom Serial to Parallel Interface

NEW

- Drive your printer at high speed (300-9600)
- Designed by Marty Goodman so you know its quality.
- Unlike other similar converters, this uses CRYSTAL oscillator which is VERY reliable at higher baud rates and different temperatures.

Only **$44.95**
w / Serial Modem Switch: **$54.95**

Studio Works

Superb Digital Audio Sampler. Great for special effects. Only **$39.95.** w/Cable: **$54.95**

MICROCOM SOFTWARE 2900 Monroe Ave, Rochester, NY 14618.
To Order and info **on free gift:** Refer to Page 17 of our 6-page series (Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

Credit Card Toll Free Orderline 1-800-654-5244
(9AM - 8PM 7 DAYS/WEEK)

UPS 2ND DAY AIR

Tech. Info (Between 4-8pm), Order Status, Info: 716-383-8830. **Fax:** 716-383-0026.

```
+5,LY+19),16:HPUT(LX,LY)-(LX+5,L
Y+19),15,PSET
610 IFLX>X-3ANDLX<X+12ANDLY<Y+17
ANDLY>Y-9THEN630
620 GOTO560
630 NP=NP-1:FORI=30TO5STEP-3:PLA
Y"V"+STR$(I)+"O4FEDO3FEDO2FEDO1F
ED":NEXTI:GOSUB730:FORI=1TO400:N
EXTI:GOSUB1450:GOTO60
640 PLAYP2$:SC=SC+250:GOSUB730:F
ORI=1TO100:NEXTI:PLAYP3$:NP=NP+1
650 DF=DF+1:GOSUB1540:IFDF>3THEN
DF=3
660 FORI=234TO30STEP-2:PALETTE6,
RND(63):A=RND(2):HPUT(I,96+A)-(I
+84,118+A),18,PSET:NEXTI:PLAY"O1
V30GFEDEV25ADEAV18EFAV12EFAAV6ED
AEV31"
670 HCOLOR7:HLINE(54,109)-(67,11
8),PSET,BF:HPUT(30,98)-(95,110),
17,PSET:X=58:Y=109:HGET(X,Y)-(X+
12,Y+18),4:A=1.4
680 PALETTE6,RND(63):FORI=1TO95:
NEXTI:HPUT(X,Y)-(X+12,Y+18),4:Y=
Y+A:IFY>192THEN690ELSEHGET(X,Y)-
(X+12,Y+18),4:HPUT(X,Y)-(X+12,Y+
18),3:A=A+1:GOTO680
690 POKE65496,0:PLAY"O1GFEDC":FO
RI=1TO450:NEXTI:PLAY"T3L3FEDL2CL
255T255":POKE65497,0:FORI=1TO990
:NEXTI:GOSUB1230:GOTO60
700 GOTO700
710 TQ=TQ+1:IFTQ<3THENRETURNELSE
TQ=0:HCOLOR7:HLINE(112+TM,8)-(11
2+TM,15),PSET:TM=TM-1:IFTM<0THEN
HCOLOR9:HPRINT(15,10),"OUT OF TI
ME":GOTO1590
720 RETURN
730 IFNP<0THEN1590ELSEHCOLOR9,7:
HPUT(22,1)-(34,19),3,PSET:HLINE(
38,7)-(48,17),PRESET,BF:HPRINT(4
,1),NP:SC$=STR$(SC):S$="0":L=LEN
(SC$):SC$=RIGHT$(SC$,L-1)
740 IFLEN(SC$)<5THENSC$=S$+SC$:G
OTO740ELSEHLINE(58,6)-(105,16),P
RESET,BF
750 HPRINT(8,1),SC$:RETURN
760 FORI=0TO15:PALETTEI,0:NEXTI:
RETURN
770 FORI=0TO15:PALETTEI,C(I):NEX
TI:RETURN
780 FORI=0TO36:READC(I):NEXTI:IF
MT=1THENFORI=0TO18:C(I)=C(I+19):
NEXTI
790 DATA 0,32,1,33,36,9,63,11,44
,63,7,40,20,4,38,16,10,11,9,0,56
,2,16,38,5,34,5,9,63,33,47,34,32
,38,7,10,11
800 FORI=1TO3:READEX(I),EY(I):NE
XT
810 DATA 222,35,138,35,54,34
820 FORI=5TO16:READFX(I),FY(I):N
EXTI
830 DATA 86,116,240,86,118,86,14
8,56,102,40,186,40,186,40,270,40
,98,80,58,118,180,118,220,158
840 P1$="O2V31DEFV20DEFV15DEFV10
DEFV5DEF
850 P$="CDEFGAB":FORI=1TO4:P2$=P
2$+"O"+STR$(I)+P$:NEXTI
860 P3$="O2T3L8;DD#EL4O+CO-L8EO+
L4CO-L8EO+L2C;L8EFF#GEFL4GL8DL4F
L2E;L255T255"
870 P4$="O2CEDFEGFAGB"
880 HSCREEN2:HCLS7:D$="D3R10U3NL
10D1G1H1G1H1G1H1G1H1G1H1"
890 HDRAW"BM100,100S12C0;XD$;":H
PAINT(108,101),9,0:HPAINT(120,10
7),8,0
900 HGET(88,96)-(143,115),1
910 D$="U2R2D2NL2E1U2G1L2E1R2":H
DRAW"BM40,40;C8S16;XD$;":HPAINT(
44,37),9,8:HPAINT(46,30),9,8:HPA
INT(50,34),8,8
920 HCOLOR8:HLINE(43,34)-(43,37)
,PSET
930 HCOLOR8:HLINE(43,34)-(43,37)
,PSET:HGET(40,28)-(52,40),5
940 HCLS7:HDRAW"BM100,100C9S12;E
1F1E1F1E1F1E1F1E1F1E1F1D3L12U3":
HPAINT(116,103),8,9
950 HCOLOR8:HLINE(100,98)-(100,1
09),PSET:HLINE(100,109)-(136,109
),PSET:HGET(100,90)-(136,109),8
960 HCLS7:D$="E1R1E1R2E1R2F1R2F1
R1F1D1L2G1L1H1G1L2H1G1L1H1L2U1;R
2F1R1R2NH1R1NE1R2R1E1R3"
970 HDRAW"BM100,100C8S12;XD$;":H
PAINT(122,96),9,8:HPAINT(134,101
),8,8:HPAINT(118,104),8,8:HPAINT
(102,101),8,8
980 HCOLOR8:HLINE(100,99)-(100,1
03),PSET:HGET(100,90)-(143,107),
9
990 HGET(0,0)-(38,35),10
1000 HCLS7:HDRAW"BM100,100C6S12;
XD$;":HPAINT(122,96),9,6:HPAINT(
134,101),6,6:HPAINT(118,104),6,6
:HPAINT(102,101),6,6
1010 HCOLOR6:HLINE(100,99)-(100,
103),PSET:HGET(100,90)-(143,107)
,11
1020 HCLS7:HCIRCLE(100,100),10,1
0:HPAINT(100,100),11,10
1030 HCOLOR7:HLINE(96,90)-(102,9
1),PSET,B:HLINE(96,109)-(102,110
),PSET,B:HSET(96,96,9):HSET(98,9
6,9):HSET(95,98,9):HSET(97,98,9)
:HGET(88,89)-(111,111),13
1040 HCLS7:D$="E1R1E1R3F1R1F1D1L
2H1G1L1H1G1L1H1D1F1R1E1F1R1E1F1R
1E1":HDRAW"BM100,100C0S12;XD$;":
HPAINT(116,97),1,0:HPAINT(122,10
4),15,0
1050 HGET(102,94)-(125,106),14
1060 HCLS7:D$="R2F1L1D2R1E1NL2H1
R1D2L1D1F1D2R2U1H1L1D3NL3R1D1L2N
U1L3E1U2NH1R2U1H1L1H1U2E1L1G1D2G
1D4G1R3"
1070 HDRAW"S8C0BM100,100;XD$;"
1080 HPAINT(99,114),0,0:HPAINT(1
01,102),9,0:HPAINT(106,115),9,0:
HPAINT(111,112),0,0:HPAINT(100,1
01),0,0
1090 HPAINT(108,117),11,0:HPAINT
(104,117),11,0:HPAINT(106,103),1
1,0:HPAINT(106,105),11,0:HSET(10
3,102,0)
1100 HCOLOR7:HLINE(96,106)-(96,1
26),PSET:HSET(98,118,7):HGET(98,
100)-(110,118),2
1110 XX=112:FORX=94TO112:FORY=10
0TO118:P=HPOINT(X,Y):HSET(XX,Y+2
0,P):NEXTY:XX=XX-1:NEXTX
1120 HGET(96,120)-(108,138),3
1130 HCLS7:D$="R1D1R1D1G1F1G1D2H
1U1E1L1U1E1L1U2":HDRAW"BM100,100
C0S12;XD$;":HPAINT(104,105),6,0
1140 HGET(100,100)-(105,119),15
1150 HCLS7:D$="F1D1G1L2H1L1H1L1H
2R5F1R2;F1R3D1L3U1BU1BR4;R2E1R5G
2L1G1L1G1L2H1U1E1":HDRAW"BM100,1
00C6S12;XD$;":HPAINT(98,105),4,6
:HPAINT(116,105),4,6:HPAINT(108,
104),6,6
1160 HGET(74,97)-(139,109),17
1170 HPUT(100,97)-(112,97+18),3,
PSET
1180 HGET(74,96)-(158,118),18:HG
ET(38,40)-(67,52),20
1190 D$="R1F1E1R3F2D1L3NU1G1U2D1
L1H1G1L1E1U1H1":HDRAW"BM40,40C2S
12;XD$;":HPAINT(54,43),3,2:HCOLO
R9:HLINE(58,44)-(60,45),PSET,BF:
HSET(60,45,0)
1200 HGET(38,40)-(67,52),19
1210 HGET(194,14)-(206,26),22:HC
IRCLE(200,20),6,0:HPAINT(200,20)
,6,0:HGET(194,14)-(206,26),21
1220 RETURN
1230 GOSUB760:HCLS7:LV=1:C(7)=C(
17)
1240 HCOLOR9,0:HLINE(0,164)-(320
,192),PSET,BF:FORI=1TO30:HSET(RN
D(320),168+RND(24),7):NEXT:HLINE
(0,164)-(320,164),PRESET
1250 HCOLOR15:FORX=10TO280STEP62
:HPUT(X,127)-(X+55,146),1,PSET:N
EXTX
1260 FORX=40TO249STEP62:HPUT(X,9
6)-(X+55,115),1,PSET:NEXTX
1270 FORX=72TO218STEP62:HPUT(X,6
5)-(X+55,84),1,PSET:NEXTX
1280 HPUT(102,34)-(157,53),1,PSE
T:HPUT(164,34)-(219,53),1,PSET
1290 HCOLOR11,0:X=274:FORY=124TO
104STEP-4:GOSUB1360:NEXT:X=56:FO
RY=92TO72STEP-4:GOSUB1360:NEXTY:
X=214:FORY=62TO42STEP-4:GOSUB136
0:NEXTY
1300 X=150:FORY=156TO142STEP-4:G
OSUB1360:NEXTY
1310 HCIRCLE(128,29),10,9:D$="R1
G1D1L1U1E1":HDRAW"BM124,25C9S8;X
D$;":HPAINT(128,29),6,9:HCIRCLE(
128,29),10,1:HSET(128,38,0)
1320 FORI=1TO4:FX(I)=FX(I+4):FY(
I)=FY(I+4):NEXTI
1330 X=12:Y=145:PN=2:H1=0:H2=0
1340 HGET(X,Y)-(X+12,Y+18),4:GOS
UB770
1350 HCOLOR10,0:HLINE(112,9)-(21
2,14),PSET,BF:HLINE(111,8)-(213,
14),PRESET,B:TM=100:RETURN
1360 HLINE(X,Y)-(X+20,Y),PRESET:
HLINE(X,Y+1)-(X+20,Y+1),PSET:RET
URN
1370 GOSUB760:HCLS7:LV=2:C(7)=C(
16)
1380 I=1:FORY=50TO164STEP38:FORX
=10TO262STEP84:CX(I)=X:CY(I)=Y:I
=I+1:HPUT(X,Y)-(X+43,Y+17),9,PSE
T:NEXTX,Y:CX(0)=CX(15):CY(0)=CY(
15)
1390 HCOLOR0,11:FORX=22TO274STEP
84:FORY=70TO150STEP38:GOSUB1440:
NEXTY,X
1400 HCOLOR0,3:FORI=1TO3:X=EX(I)
:Y=EY(I)+25:HLINE(X,Y)-(X+37,Y+3
),PSET,BF:HLINE(X,Y)-(X+37,Y+3),
PRESET,B:NEXTI:X=EX(3):Y=EY(3)+2
5
1410 HCIRCLE(32,42),10,9:D$="R1G
1D1L1U1E1":HDRAW"BM28,38C9S8;XD$
;":HPAINT(32,42),6,9:HCIRCLE(32,
42),10,1
1420 FORI=1TO4:FX(I)=FX(I+8):FY(
I)=FY(I+8):NEXTI
1430 C=1:EE=1:X=272:Y=152:PN=3:G
OTO1340
1440 FORI=Y TOY+16STEP4:HLINE(X,
```

BIG BASIC

Full Power for your CoCo 3!
(From Danosoft)
Gives up to 92K User Memory in 128K CoCo and 476K in 512K CoCo from BASIC with any mix of program/variables. You can have one BIG program or 58 Separate ones running at once from computer memory in multiple windows! Big Basic also allows you to Disk Chain any size program. Step up to the full potential of your CoCo 3 with Big Basic. Only **$39.95**

512K Upgrades

Fully assembled, tested and ready to be shipped NOW! Our design allows mounting chips on top to prevent any heating problems. No soldering; Easy instructions for 2 minute installation! Comes with following software (value $100):

- 512K Ramtest
- 512K Backup Lightning
- 512K Print Spooler
- 512K Ramdisk
- OS9 Level II Ramdisk

Only **$99**

The absolute best 512K Upgrade Package Available!
90 day warranty! **New Low Price** $~~109~~
0K Upgrade Board (with 512K Ramtest/Ramdisk/Spooler): $**39.95**

Upgrades for CoCo 2

64K Upgrade (8 chip) for CoCo I, CoCo II's with Cat # 26-3026/3027/3134/3136: $**29.95**
64K Upgrade (2 chip) for 26-3134 A/B CoCo II: $**39.95**
(Free 64K Software included with 64K Upgrades)

KEYBOARDS, ETC...

6 Feet Keyboard Extension Cable. Only $39.95
CoCo 3 Keyboard: $39.95 w/ Extension Cable: **$69.95**
CoCo 2 Keyboard: $19.95 w/ Extension Cable: **$49.95**
(CoCo 3 Keyboard includes free Function Keys Software)

XPort (From Orion Technologies®)

The extended multi-port interface for CoCo 1, 2 or 3. ● 3 Cartridge Slots ● 12 Volts powers anything ● Use for disk, RS232 Pak much more ● Buffered I/O ● Perfect replacement for discontinued multi-pak. Intro Special. Only **$74.95**

EPROM ...

INTRONICS EPROM PROGRAMMER: Programs 2516 to 27010 & more! Includes software & complete documentation. Latest version. Lowest Price Anywhere. CoCo 1,2,3. Only **$137.95**
DATARASE Eprom Eraser: For 24/28 pin Eproms. Erases up to 4 EPROMs at a time. Only **$49.95**
Both Eprom Programmer & Eraser: $179.95
Datarase II
2764 Eprom: $8 **27128 Eprom: $9**
ROMPAK (w/ Blank PC Board, 27xx Series): $12.95
BLANK CARTRIDGE (Disk Controller Size): $10.95

CABLES, Etc.

Magnavox 8505/8515/8CM643 Analog RGB Cable: $24.95
Serial-to-Parallel Interface: Use your parallel printer at high speed (300-9600 baud) with the CoCo. Comes with all cables. No software compatibility problems. Only **$44.95**
15" Shielded Multipak Extension Cable: $36.95
Y Cable: Use your disk system with Speech/RS232 Pack, DS69 Digitizer, etc. Only **$27.95**
RGB Analog Extender Cable: $19.95
SONY Monitor Cable: $29.95
MODEM Cable: 4 pin to DB25. Only **$19.95**
2 Position Switcher: Hook 2 devices to serial port. **$29.95**
HI-RES Joystick Interface: $11.99

COMMUNICATIONS EXTRAVAGANZA 2400

(1) **ZOOM 2400 Modem:** Fully Hayes Compatible 300/1200 /2400 w speaker, Auto Dial/Answer & **Seven Year** Warranty!
(2) **MODEM CABLE** (4pin to DB25; Reg $19.95)
(3) **Autoterm** Software (Reg $39.95)
(4) Free Compuserve Offer & Access Time
(5) **UPS 2nd Day Air Shipping**
Only **$189.95**

Zoom 2400 Modem: $149
Avatex 1200e Modem Only : $85
Communications Extravaganza 1200: Includes Avatex 1200e modem w/ 2 Year Warr., cable, Compuserve Offer, software & 2nd Day Air Shipping. Only $**129.95**

CHIPS, Etc.

Genuine RS Disk Rom 1.1 (Needed for CoCo 3): **$29.95**
ECB Rom 1.1: $29.95
68B09E Chip: $14.95 **68B21 Chip: $5.95**
GIME Chip for CoCo 3:**$39.95**
Genuine RS Multipak PAL Chip (Specify 26-3024 / 26-3124): **$19.95**
PAL Switcher: Allows you to switch between CoCo 2 & 3 modes when using the Multipak. You need the OLDER & NEW PAL Chip for the 26-3024 Multipak. Only **$39.95.** With NEW PAL Chip Only **$49.95**

MJF MICROCOM SOFTWARE 2900 Monroe Ave, Rochester,NY 14618

VISA MasterCard AMERICAN EXPRESS DISCOVER

To Order: All Orders $75 and above (except Printers, Monitors, Drives, Computers) shipped by **UPS 2nd Day Air** at no extra charge in Continental US. All orders $150 or above and Word Power 3.3 orders will receive a free **T-Shirt till Jan 31, 1990!** We accept Visa, MC, Amex, Discover, Check, MO & School PO's. Please add $3.00 S&H ($10 for Drives) in Continental US; all others add 10% S&H (Min $5). NYS Residents please add sales tax. Our Australian Agent: Australian Peripheral Development. Ph: 07-341-9061.

Credit Card Toll Free Orderline: **1-800-654-5244** (9AM-8PM 7 Days/week)
Tech. Info (Between 4-8pm), Order Status, Info: 716-383-8830. Fax: 716-383-0026.

UPS 2ND DAY AIR

The CoCo Picture Show

Introducing CoCo Gallery On Disk! We've got the pictures. You supply the popcorn and beverages.

Enjoy the best from past issues of CoCo Gallery on your own CoCo. Volume 1 is available in a CoCo 1 or 2 version (25 pictures) and a CoCo 3 version (11 pictures). The pictures offered in each version are different. If you have a CoCo 3, get both versions for a total of 36 pictures.

Yes! Send me Volume 1 of CoCo Gallery on Disk for
___ CoCo 1 or 2 ($7.95) ___ CoCo 3 ($7.95)
Name ____________________
Address ____________________
City ____________ State __ ZIP ________
Kentucky residents add 5% sales tax.
My check in the amount of ______ is enclosed.
Bill to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number ____________________
Expiration Date ________ Signature ________________
Mail to: CoCo Gallery On Disk, The Falsoft Building, P.O. Box 385, Prospect, KY 40059
For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST
All other inquiries call (502) 228-4492.

```
I)-(X+20,I),PRESET:HLINE(X,I+1)-
(X+20,I+1),PSET:NEXTI:RETURN
1450 HSCREEN2:GOSUB760:HCLS7:LV=
3:IFMT<>1THENC(7)=C(18)ELSEC(7)=
5
1460 FORX=20TO280STEP40:FORY=90T
O186STEP40:HPUT(X,Y)-(X+23,Y+22)
,13,PSET:NEXTY,X
1470 HCOLOR13:HLINE(32,150)-(33,
172),PSET,B:HLINE(272,110)-(273,
132),PSET,B:FORY=155TO168STEP2:H
LINE(26,Y)-(39,Y),PSET:NEXTY:FOR
Y=115TO128STEP2:HLINE(266,Y)-(27
9,Y),PSET:NEXTY
1480 FORX=319TO60STEP-24:HPUT(X-
23,56)-(X,68),14,PSET:HPUT(X-23,
26)-(X,38),14,PSET:NEXTX
1490 HCOLOR13:HLINE(32,64)-(33,9
3),PSET,B:FORY=64TO89STEP2:HLINE
(26,Y)-(39,Y),PSET:NEXTY
1500 HPUT(246,42)-(311,54),17,PS
ET
1510 FORI=1TO4:FX(I)=FX(I+12):FY
(I)=FY(I+12):NEXTI
1520 X=272:Y=152:PN=3:L1=0:L2=0
1530 GOTO1340
1540 GOSUB760:HCLS7:GOSUB730:C(7
)=C(17)
1550 FORX=0TO320STEP24:HPUT(X,18
0)-(X+23,192),14,PSET:NEXTX
1560 HCOLOR13:HLINE(0,55)-(28,19
2),PSET,BF:HCOLOR3:FORI=0TO28:HL
INE(I,55)-(I,55-RND(3)),PSET:NEX
TI
1570 HPUT(174,50)-(217,67),9,PSE
T:HPUT(54,134)-(97,151),9,PSET:H
PUT(236,136)-(279,153),9,PSET
1580 GOSUB770:RETURN
1590 HCOLOR9,7:HLINE(124,94)-(20
2,104),PRESET,BF:HPRINT(16,12),"
GAME OVER":FORI=1TO4:PLAY"V"+STR
$(I*7):FORO=5TO1STEP-1:PLAY"O"+S
TR$(O)+"BGEC":NEXTO,I
1600 IFBUTTON(0)=1THEN50ELSE1600
1610 DF=0:GOSUB760:HSCREEN2:HCLS
3
1620 D$="R3G1L1G1D3F2L2H1U4E2R3G
1D2R2U1L1D1R1U1R1D1L1U2NH1U1F1D2
R3F2L7;H1NR1ND1F1R5G1L5H1U1E1G1D
1F1R2G1L4H1U4E2"
1630 HCIRCLE(160,92),40,15,.75:H
CIRCLE(160,92),50,15,.75:HPAINT(
118,96),13,15:HPAINT(160,92),7,1
5:HDRAW"BM140,70C0S24;XD$;"
1640 HPAINT(140,107),0,0:HPAINT(
180,95),14,0:HPAINT(146,89),9,0:
HPAINT(164,79),8,0:HPAINT(172,79
),8,0:HPAINT(166,84),15,0:HPAINT
(174,84),15,0
1650 HCOLOR7:HLINE(142,68)-(143,
72),PSET,BF:HLINE(140,70)-(145,7
0),PSET
1660 HCOLOR0:HPRINT(13,5),"PENGU
IN ICARUS":HPRINT(16,17),"(C)199
0":HPRINT(12,18),"by Nick Bradbu
ry":HPRINT(10,20),"press 'fire'
to begin":GOSUB770
1670 PALETTE13,RND(63):IFBUTTON(
0)=0THEN1670
1680 NP=4:GOSUB1230:GOTO60
1690 SOUND20,4:RETURN
1700 CMP:POKE65496,0:HSCREEN0:EN
D
```

CoCo 3

50 134
END 102

Listing 2: DEMO

```
0 ' COPYRIGHT 1990 FALSOFT, INC
10 ONBRK GOTO90
20 HBUFF1,235:HBUFF2,235
30 HSCREEN2:HCLS:PALETTE0,0:POKE
65497,0
40 FORI=1TO300:HSET(RND(320),RND
(192),RND(15)):NEXT:HCIRCLE(160,
96),44,5:HPAINT(160,96),3,5
50 HGET(0,0)-(20,20),2:HCOLOR4:H
LINE(0,0)-(20,20),PSET,BF:HGET(0
,0)-(20,20),1
60 FORX=0TO298STEP6:HPUT(X,Y)-(X
+20,Y+20),2:HGET(X+6,Y)-(X+26,Y+
20),2:HPUT(X+6,Y)-(X+26,Y+20),1
70 NEXTX:HPUT(X,Y)-(X+20,Y+20),2
:Y=Y+20:IFY>170THENY=0
80 GOTO60
90 HSCREEN0:POKE65496,0:END
```

7 GOOD REASONS TO BUY CoCo Max III & Max–10 NOW

1) **Customer Satisfaction:** 10,000 Colorware customers can't be wrong.

2) **Incredible performance:** CoCo Max is the best graphics software, and Max–10 is the best word processor.

3) **Highly Recommended:** "The Rainbow" magazine stated "Max–10 takes a back seat to none" and "CoCo Max III is the ultimate program."

WOW!

4) **The following offer is unprecedented:** CoCo Max III and Max–10 together for not $149.90, not $79.95, but now only **$59.95**. Unbelievable!

5) **Bonus Offer!** Get any of the following "addons" for only $14.95 each: Spellchecker, Max–10 Fonts, Max Fonts Set A, Max Fonts Set B, Color Printer Drivers, Max Edit.

6) **Limited Time!** These unbelievable offers end March 31, 1990. Don't miss out!

7) **They Agree!** These women don't agree on anything but all three love CoCo Max III and Max–10.

System Requirements

Max–10 and CoCo Max III Require: any CoCo 3; 1 or more disk drives; joystick or mouse; Radio Shack Hi Resolution joystick interface; a video or RGB monitor or a TV.

Max–10...$39.95

Max–10 is the ultimate word processor. It allows on screen mixing of graphics and text, large headlines, multiple columns and full page preview with graphics. Without a doubt, Max–10 will add excitement to your word processing, and that's no small task!

PRINTERS SUPPORTED: EPSON FX,MX,RX,LX & COMPATIBLES; DMP 105,106,130; CGP220 (B&W); OKI 182,92,192; STAR NX-10, NX-1000.

Max–10 Add-ons

- **Max–10 Fonts**. 36 super fonts on 2 disks.................................. **$29.95**

Max-10 and CoCo Max Fonts aren't interchangeable.

- **Spell Checker** 35,000 word dictionary for online spell checking and dictionary lookup. Perfect seamless integration with Max–10.. **$29.95**

CoCo Max III...$49.95

Whether you doodle for fun or do graphics for a living, **CoCo Max** will amaze you. It's a promise. **Its major features include:** Huge picture area (2 full hires 320x192 screens). Large editing window. **Zoom** mode for detail work. 28 point and click drawing tools. Shrink and stretch. **Rotation** at any angle (1.5° steps). 512K memory support (all features work with 128K too). Undo (Oops) feature to fix mistakes. **Animation**. Special effects. Color sequencing (8 colors, variable speed). 13 fonts (more available). Each font has 8 sizes and 5 styles for thousands of possible combinations. Translate program to convert most types of pictures. **CoCo Show** "slide show" program. Miniload program to help use pictures with your software. Color editing of patterns. Prints in single or double size. Select 16 of 64 available colors, all 64 colors are shown at once for easy selection. Pull-down menus. **40 paint brush** shapes. 2 color lettering. Spray can. Amazing "flowbrush". RGB and composite monitor support. Colors print in 5 shades of gray.

PRINTERS SUPPORTED: EPSON RX, FX,MX,LX AND COMPATIBLES; STAR/GEMINI NX-10,NX-1000; DMP100,105,106,110,120,130,200; OKI 82A,182,192; CGP-220(B&W)

Color Drivers. See below.

CoCoMax 3 Addons

- **Max Fonts set A, Max Fonts set B.** Each set has two disks and over 40 fonts.. **$29.95**

Both sets (95 fonts)....................... **$49.95**

- **Max Edit** Create new fonts or edit existing ones.................................. **$19.95**

- **Color Printer** drivers NX–1000 Rainbow, CGP–220, and Okimate 20.. **$19.95**

Digitizers

Digitize any picture from any video source (VCR, camera...) for use with CoCo Max 3 or Max–10. The above pictures of Barbara, Arnette and Sunny were taken with the DS–69B.

DS–69. Requires Multipak. 2 pictures per second.. **$99.95**

DS–69B Faster: 8 pix/sec. Multipak not required.. **$149.95**

A·Bus

Data Acquisition and Control boards. Call Alpha Products at number below.

Ordering Information: We accept Visa, Mastercard, Checks, M.O. C.O.D. is $4 extra. Purchase orders subject to credit approval. Connecticut residents add 8% sales tax. Shipping: $4 per order (usually UPS ground). Canada: $6 per order (Airmail). Outside USA & Canada: Add 10% of order total. UPS 2nd Day Air: $6 extra. Next Day service available.

COLORWARE

Call or Write Now

(203) 656–1806
Weekdays 9–5 Eastern Time

242 West Avenue,
Darien CT 06820

4597.27 +
4374983.00 +
4745.49 +
4384325.76 T
0.00 +
47484.00 -
4336841.76 T
0.00 +
27.47 /
157875.56 T
0.00 +
3748.58 /
3847.39 +
3889.51 T
0.00 +
3948.39 +
4839.47 +
3849.19 -
1748.20 +
10576.37 T
0.00 +
19487.48 +
30063.85 T
0.00 +
4749.35 -
25314.50 T
0.00 +
4749.38 -
3759.37 +
3748.39 +
199.95 +
0.00 +
90128.32 T

A printing calculator within the CoCo

Reckoning With the CoCo

by Bill Minze

Because of the high prices asked for printing calculators, I decided to make my Color Computer fill the need. *Calculate* runs on any CoCo with Extended BASIC and either tape or disk. A printer is optional. When the program starts, you go straight to the calculator if a printer is on line. If a printer is not on line, you are asked if you are going to use a printer. If you answer Yes, you should put the printer on line or *Calculate* will wait until the printer is ready. At any time during program execution, you can toggle the printer on and off by holding down the SHIFT key and pressing CLEAR.

The calculator screen displays letters that stand for the following:

E - Current entry
S - Subtotal
T - Total
L - Last entry you made

Negative numbers are displayed with a minus sign in front of them. If at some time you press an unacceptable key, you will hear a two-tone sound, and the top line of the screen will tell you what to do. One of these instructions comes up if you try to divide by zero, which would ordinarily create a Divide By Zero Error. This can also happen if you press the division key twice in a row without a number in between. All you have to do to save your previous entries is enter the number 1 and continue. This divides your subtotal by one, which does not change the subtotal.

The SHIFT key is not needed to enter a plus sign (+) or an asterisk (*). It can be used, but the keys will work unshifted. The equal sign (=) is used with SHIFT, and ENTER has the same effect as an equal sign. C clears one or all entries. If you accidentally press BREAK, type `CONT` and press ENTER twice. This puts you back where you were before BREAK was pressed. The display is a little messy, but all entries are correct.

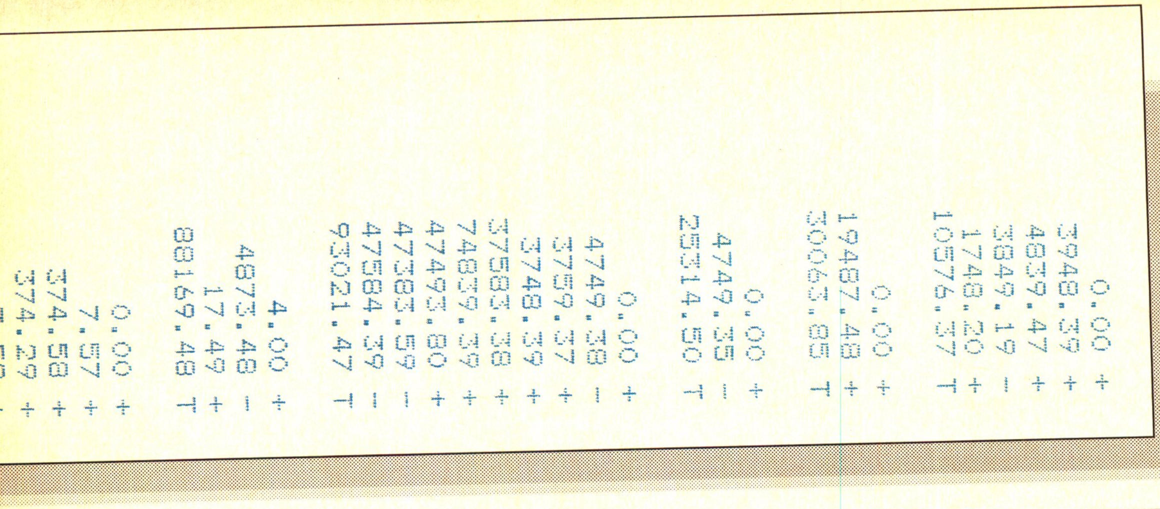
The program allows eight digits to the left of the decimal point. This allows enough digits to cover most of my bank accounts. It also allows two digits to the right of the decimal; if a third digit is entered, *Calculate* will round off the second and not accept any more. If your total goes over eight digits to the left of the decimal, the screen and printer formats get messed up, but the answer will be correct. Also, after nine digits to the left of the decimal, the answer is displayed and printed in exponential notation format. ❑

Bill Minze, a New York city firefighter, started computing with the CoCo in 1981 and now uses a CoCo 3. He uses his CoCo for record keeping, and his three children use it for games. He may be contacted at 49 Frank Court, Brooklyn, NY 11229, (718) 332-0551.

Line	**Description**
7 - 13	Test for printer
14 - 16	Set the first screen,
17	`PRINT USING` string & start calculation
18 - 28	`INKEY$` and test for which key was entered
29 - 33	The calculation to be made
34 - 39	Addition routine
40 - 45	Subtraction routine
46 - 51	Multiplication routine
52 - 57	Division routine
58 - 63	Equal routine
64 - 67	Clear entry
68 - 70	Clear calculator
71	Test if a total was the last operation
72 - 75	Holds numbers until a math function
76 - 78	Inappropriate entry
79 - 80	Division by 0 routine
81 - 82	Switch printer on-off

List of Variables

`N$` - Holds `PRINT USING` string
`X$` - Holds Y or N print on-off
`Z$` - Each character as entered
`ZO$`- Holds `Z$`
`P` - Holds value of `ZO$`
`ST` - Holds subtotal & total
`C` - To know if total was made
`B` - Counts the number of digits



```
    0.00 +
 3948.39 +
 4839.47 +
 3849.19 -
 1748.20 +
10576.37 T

    0.00 +
19487.48 +
30063.85 T
    0.00 +
 4749.35 -
25314.50 T
    0.00 +
 4749.38 -
 3759.37 +
 3748.39 +
37583.38 +
74839.39 +
47493.80 +
47383.59 -
47584.39 -
93021.47 T
    4.00 +
 4873.48 -
   17.49 +
88169.48 T
    0.00 +
    7.57 +
  374.58 +
  374.29 +
```

16K Extended

10	9
19	173
27	55
35	189
42	80
49	158
58	87
68	181
75	135
END	143

The Listing: CALCULAT

```
0 ' COPYRIGHT 1990 FALSOFT, INC
1 '   ********************
2 '   *     CALCULAT     *
3 '   *        BY        *
4 '   *    BILL MINZE    *
5 '   *  BROOKLYN  N.Y.  *
6 '   ********************
7 X=PEEK(65314):IF INT(X/2)=X/2
THEN X$="Y"
8 IF X$="Y" THEN 14:CLS
9 CLS:PRINT@128,"**THERE IS NO P
RINTER ON LINE***"
10 PRINT@192,"*** ARE YOU USEING
 A PRINTER ***"
11 PRINT@267,"YES OR NO"
12 X$=INKEY$:IF X$=""THEN 12
13 IF X$="Y" OR X$="N"THEN 14 EL
SE PRINT@327,"ANSWER WITH Y OR N
":GOTO 12
14 CLS
15 PRINT@434,"S          0.00"
16 PRINT@480,"E          0.00"
17 N$="########.##":GOTO 34
18 Z$=INKEY$:IF Z$=""THEN18
19 IF Z$=CHR$(92)THEN81
20 IF Z$>CHR$(47) AND Z$<CHR$(58
)THEN 71
21 IF Z$=CHR$(46)THEN71
22 IF Z$=CHR$(43) OR Z$=CHR$(59)
 THEN RETURN
23 IF Z$=CHR$(45) OR Z$=CHR$(47)
THEN RETURN
24 IF Z$=CHR$(42) OR Z$=CHR$(58)
THEN RETURN
25 IF Z$=CHR$(61) OR Z$=CHR$(13)
 THEN58
26 IF Z$=CHR$(67)THEN64
27 IF Z$=CHR$(12) THEN 68
28 PRINT@0,"*USE NUMBERS OR MATH
 SIGNS ONLY*":SOUND100,10:SOUND1
50,10:GOTO 18
29 IF Z$=CHR$(43) OR Z$=CHR$(59)
THEN 34
30 IF Z$=CHR$(45) THEN 40
31 IF Z$=CHR$(42) OR Z$=CHR$(58)
THEN46
32 IF Z$=CHR$(47) THEN 52
33 IF Z$=CHR$(61) OR Z$=CHR$(13)
THEN59
34 GOSUB 18:ST=ST+P
35 PRINT@434,"S":PRINT@437,USING
 N$;ST
36 IF C=0 THENPRINT@384,"L+":PRI
NT@387,USING N$;P ELSE PRINT@384
,""
37 PRINT@480,"E          0.00"
38 IF X$="Y"THEN PRINT#-2,USING
N$;P;:PRINT#-2," +"
39 C=0:P=0:Z0$="0":B=0:GOTO 29
40 GOSUB 18:ST=ST-P
41 PRINT@434,"S":PRINT@437,USING
 N$;ST
42 IF C=0 THEN PRINT@384,"L-":PR
INT@387,USING N$;P ELSE PRINT@38
4,""
43 PRINT@480,"E          0.00"
44 IF X$="Y"THEN PRINT#-2,USING
N$;P;:PRINT#-2," -"
45 C=0:P=0:Z0$="0":B=0:GOTO 29
46 GOSUB 18:ST=ST*P
47 PRINT@434,"S":PRINT@437,USING
 N$;ST
48 IF C=0 THEN PRINT@384,"L*":PR
INT@387,USING N$;P ELSE PRINT@38
4,""
49 PRINT@480,"E          0.00"
50 IF X$="Y"THEN PRINT#-2,USING
N$;P;:PRINT#-2," *"
51 C=0:P=0:Z0$="0":B=0:GOTO 29
52 GOSUB 18:IF P=0 THEN GOTO 79
53 ST=ST/P:PRINT@434,"S":PRINT@4
37,USING N$;ST
54 IF C=0 THEN PRINT@384,"L/":PR
INT@387,USING N$;P ELSE PRINT@38
4,""
55 PRINT@480,"E          0.00
56 IF X$="Y"THEN PRINT#-2,USING
N$;P;:PRINT#-2," /"
57 C=0:P=O:Z0$="0":B=0:GOTO 29
58 RETURN
59 PRINT@434,"T":PRINT@437,USING
 N$;ST
60 PRINT@384,"T":PRINT@387,USING
 N$;ST
61 PRINT@480,"E          0.00"
62 IF X$="Y"THEN PRINT#-2,USING
N$;ST;:PRINT#-2," T"CHR$(10)
63 P=0:Z0$="0":C=1:B=0:GOTO 34
64 PRINT@434,"S":PRINT@437,USING
 N$;ST
65 PRINT@384,""
66 PRINT@480,"E          0.00"
67 Z0$="0":P=0:C=1:GOTO 18
68 P=0:Z0$="0":ST=0:C=0:B=0
69 IF X$="Y"THEN PRINT#-2,"
CLEAR"CHR$(10):PRINT#-2,USING N$
;P;:PRINT#-2," T"
70 GOTO14
71 IF C=1 THEN 76
72 IF Z$=CHR$(46) THEN B=0
73 B=B+1:IF B=9 THEN PRINT@0,"*O
NLY 8 DIGETS LEFT OF DECIMAL*":S
OUND100,10:SOUND150,10:GOTO 64
74 Z0$=Z0$+Z$:P=VAL(Z0$)
75 PRINT@448,"E":PRINT@451,USING
 N$;P:GOTO 18
76 PRINT@0," USE MATH SIGN FIRS
T + - * /"
77 SOUND100,10:SOUND150,10:C=0
78 GOTO18
79 PRINT@0,"YOU CAN NOT DEVIDE B
Y ZERO ENTER  NUMBER <1> NOW TO
SAVE YOUR    PREVIOUS ENTRIES, A
ND CONTINUE"
80 SOUND100,10:SOUND150,10:GOTO5
2
81 IFX$="Y"THEN X$="N"ELSEX$="Y"
82 GOTO 18
```

OUR LATEST 30 ISSUES

ISSUE #60, JUNE 1987
JOB COSTING
LABELS
CATCH A CAKE
COCO MATCH
ROBOTS
STREET RACERS
BOWLING3
ELECTRONICS 3
GRAFIX
KRON

ISSUE #61, JULY 1987
EZORDER
SUBMISSION WRITER
KEYS ADVENTURE
WALL PAPER
CHOPPER COMMAND
UNDERSTANDING OPPS.
BITCODE
ELECTRONICS 4
KINGPEDE
RAIDER

ISSUE #62, AUG.1987
PENSION MANAGEMENT
HERBS
CATALOGER UTILITY
RAIDERS
ALPHABETIZING
UFO
ELECTRONICS 5
RAMBO ADVENTURE
BLOCKS
CAVE

ISSUE #63, SEP. 1987
GENEOLOGIST HELPER
SMART COPY
MAINTENANCE
COCO3 - COCO2 HELP
DIRECTORY PICTURE
SUBSTANTIAL ATTACK
SAVE THE MAIDEN
CAVIATOR
ELECTRONICS 6
MONKEY SHINE

ISSUE #64, OCT. 1987
GARDEN PLANTS
FORT KNOX
ELECTRON FORMULAS
SNAKE IN THE GRASS
CYCLE JUMP
GEOMETRY
WIZARD
GAME OF LIFE
ELECTRONICS 7
FLIGHT SIMULATOR

ISSUE #65, NOV. 1987
TAXMAN
DAISY DOT
CHILD STONE ADVENT.
SIR EGGBERT
CROWN QUEST
GYM KHANA
COCO 3 DRAWER
FOOTBALL
ELECTRONICS 8
CHOP

ISSUE #66, DEC. 1987
ONE ROOM ADVENTURE
OS9 TUTORIAL
RIVER CAPTAIN
SOUNDS
BETTING POOL
ADVANCE
MATH TABLES
ELECTRONICS 9
LOWER TO UPPER
NOIDS

ISSUE #67, JAN. 1988
MEDIA MASTER
SAVE THE EARTH
WEIGHTS & MEASURES
LOW RES GRAPHICS
COAST TO COAST
BACCARAT
BATTLE SHIP
ELECTRONICS 10
TAPE CONVENIENCE
DUEL

ISSUE #68, FEB. 1988
COINFILE
WORD COUNTER
SQUIRREL ADVENTURE
AREA CODES
DRAW POKER
TURTLE RACES
ELECTRONICS 11
MULTI-SCREEN
CANON PRINT
COCO TENNIS

ISSUE #69, MAR. 1988
POLICE CADET
STAMP COLLECTION
BARRACKS ADVENTURE
CITY/TIME
HI-LO/CRAPS
OLYMPICS
HI-RES CHESS
ELECTRONICS 12
DOUBLE EDITOR
DOUBLE BREAKOUT

ISSUE #70, APR. 1988
BLOTTO DICE
SUPER COMM
GENESIS ADVENTURE
PLANETS
PHK/WAR
SIGN LANGUAGE
ARX SHOOTOUT
ELECTRONICS 13
MAGIC KEY
SNAP PRINT

ISSUE #71, MAY 1988
SUPER LOTTO
RODOL ADVENTURE
MAZE
YAHTZEE3
PHASER
SHAPES/PLATES
STAR WARS
ELECTRONICS 14
PRINTER CONTROL
MAZE 2

ISSUE #72, JUNE 1988
MARKET WATCHER
3 STOOGES
HOSTAGE ADVENTURE
PROGRAM TRIO
GLADIATOR
U.S. & CANADA QUIZ
JEOPARDY
ELECTRONICS 15
COCO 3 PRINT
CTTY

ISSUE #73, JULY 1988
FOREIGN OBJECTS
CHESS FUNDAMENTALS
WATERFOWL QUIZ
WHAMMY 3
ADVENTURE TUTORIAL
CIRCLE 3
EDUCATION TRIO
WRITE-UP EDITOR
PICTURE PACKER
AIR ATTACK

ISSUE #74, AUG. 1988
VIDEO CAT 3
1 EYE WILLIE
JAVA
GAME TRIO
CRIONAUT WARRIOR
ENVELOPE PRINT
RAM DRIVE 3
MODE 2
XMODEM TRANSFER
CAVE II

ISSUE #75, SEP. 1988
DRACULA ADVENTURE
HELP TRIO PROGRAM
SHOWDOWN DICE
TARZAR 1 ADVENTURE
ARAKNON
CASH FLOW REPORTING
GRAPHICS LETTER
GRAPHIC EDITOR
ADDRESS BOOK
SQUARES

ISSUE #76, OCT. 1988
SUPER BLITZ 3
CHAMBERS
TRIO RACE
EARTH TROOPER
STARGATE
BOWLING SECRETARY
DISK TUTORIAL
JOYSTICK > KEYBOARD
KEYBOARD < JOYSTICK
* SAILORMAN

ISSUE #77, NOV. 1988
POLICE CADET #2
STARSHIP SHOWDOWN
MUSIC COMPOSER
COUPONS/REBATES
PROGRAM LIBRARY
BOYSCOUT SEMAPHOR
HOUSEHOLD CHORES
MAXOMAR ADVENTURE
CHUCK LUCK3
* BUZZARD BATE

ISSUE #78, DEC. 1988
POLICE CADET #3
TANK TURRET
WAR OF THE WORLDS
SPINSTER CAFE
COCO-SIZE
SIGN MAKER
LEGAL DEDUCTIONS
BOOK KEEPING
CAR LEASE 3
* WAREHOUS MUTANTS

ISSUE #79, JAN. 1989
POLICE CADET #4
DRAW POKER 3
TILER TEX
BATTLE
INSIDE THE COCO
COCO BULLETIN BOARD
HOT DIRECTORY
VCR TUTORIAL
PRINTER CONTROL
* THE KING

ISSUE #80, FEB. 1989
SCRABBLE
SPELLING CHECKER
SANDSTONE ADVNT.
THE FAMILY FEUD
HARNESS3 HANDICAP
MINIGOLF 3
ULTIMATERM 3
NETWORKING TUTORIAL
A-MAZING PLACE
* MONEYOPOLY

ISSUE #81, MAR. 1989
MONSTERS
SUPER CONCENTRATION
TEN PROGRAMS COCO3
FINANCE
SNOWBALL FIGHT
RULER
POP-UP WINDOWS
TARZAR2 - CASTLE
SUPER LISTER
* DRACONIAN

ISSUE #82, APR. 1989
DUNGEON MAZE
DISK TRANSFER
MAIL MERGE
SUPER SPREADSHEET
BLASTER
TILER TWO
DREAM TUNNEL
DISK UTILITY 3
EDUCATION TRIO
* LUNCHTIME

ISSUE #83, MAY 1989
T&D FIRST 80
MODEM BATTLESHIP
CHURCH MANAGER
SUPER FILE SORT
BASEBALL STATS
TARZAR PT. 3
INVOICE
CARD SQUEEZE
SWORDPLAY 1 + 2
* BREWMASTER

ISSUE #84, JUNE 1989
CROSSWORD PUZZLES
MOUNT DEATH
TERRON
DISK/TAPE TRANSFER
PAPER WORKS
SUPER DATABASE
CONNECT3
BUSINESS MODEL
MASS FORMAT
* CHAMBERS

ISSUE #85, JULY 1989
5 PLAYER POKER
RESUME WRITER
CRAZY CHEMIST
JOURNEY UP
SUBMAINIA
WORKBENCH
VACATION PLANNER
DISK EDITOR II
NIGHT OF THE NINJA
* MARTIAN CRYPT

ISSUE # 86, AUG. 1989
TIME TRAP
PHONE ACCOUNTANT
ON TARGET
NAME THAT TUNE 3
LASER DEFENCE
CHECKBOOK BALANCER 3
KROACH ADVENTURE
SUPER BAR GRAPH
EASY LETTER
* DEVIL ASSAULT

ISSUE #87, SEPT. 1989
PURCHASE ORDER
INVENTORY INVOICE
AMERICAN TRIVIA
KROACH2 ADVENTURE
TETRA
SOLO POKER
GALAXY Q3
IBM PICTURE VIEWER
RGB PATCH
* KING TUT

ISSUE #88, OCT. 1989
SALES PROSPECTING
VIRUS 3
WILL MAKER
JOURNAL-GEN. LEDGER
POLICE CADET #5
RED DOG
MAD LIBS
MACINTOSH PICT. SAVER
FROG
* P51 FLIGHT SIMULATOR

ISSUE #89, NOV. 1989
SPEECH INDEXER
QUEST ADVENTURE
EDUCATION TRIOS
BIG LETTER
PANGO
ELEMENTS
GARDEN PLANNER
VIDEO SHOW
WARP
* QUIX

ISSUE #90, DEC. 1989
MUSIC-4 VOICE
HONEYCOMB
POINT OF SALE
IBM - COCO
CIVIL WAR
LIST UTILITIES
BREAK-IN COCO III
LABYRINTH MASTER
* COLOR CAR ACTION

EACH ISSUE CONTAINS 10 PROGRAMS READY TO LOAD.

AVAILABLE ON TAPE OR DISK.

SUPER SAVINGS

SINGLE ISSUE................	$ 8.00
2-5 ISSUES......................	$ 6.00 EA
6-10 ISSUES......................	$ 5.00 EA
11 OR MORE ISSUES......	$ 4.50 EA
ALL 90 ISSUES................	$ 240.00

PURCHASE 20 OR MORE ISSUES
AND RECEIVE A FREE
6 MONTH SUBSCRIPTION

VISA

MasterCard

COCO I, II, AND III

- **All Programs Include Documentation.**
- **We Send 1st Class - No Charge!**
- **For Information on Subscription Prices, Turn to Pages 57 & 89**

ONE YEAR SUBSCRIPTION ONLY $ 70.00 !

RAINBOW
CERTIFICATION
SEAL

* TOM MIX PROGRAMS

Mail Or Call

T&D

T&D SOFTWARE
2490 MILES STANDISH DR.
HOLLAND, MI. 49424

(616) 399-9648

PLEASE CIRCLE

TAPE

OR

DISK

1	9	17	25	33	41	49	57	65	73	81	89
2	10	18	26	34	42	50	58	66	74	82	90
3	11	19	27	35	43	51	59	67	75	83	
4	12	20	28	36	44	52	60	68	76	84	
5	13	21	29	37	45	53	61	69	77	85	
6	14	22	30	38	46	54	62	70	78	86	
7	15	23	31	39	47	55	63	71	79	87	
8	16	24	32	40	48	56	64	72	80	88	

Name ______________________________

Address ____________________________

City ____________________ State ______ Zip __________

Card # ____________________________ Total $ ________

A free-form program that lets you create a unique database

The Golden Retriever

by Shane Messer

After looking at all of the database programs on the market, I have found only a few that satisfy my need to keep track of more than just phone numbers and addresses. I want a program to run on the CoCo 3, use the 80-column mode, print records and keep track of virtually any type of data. This narrows things down a bit.

Another inhibiting factor is the price tag. For me and probably for other CoCo users as well, $60 is steep. This is why I decided to write *ColorBase*, the last database you will ever need. Here are a few of the program's features:

- Completely menu driven
- Field entry
- Up to 255 characters of data per record
- Up to 400 or more records per disk
- Compatibility with a RAM disk for extremely fast operation
- The ability to print one or all of the records
- More than one database per disk
- Choice of default startup colors

Some of you may be shaking your heads, thinking this project will be too hard. It's really not. You don't even have to know how to program. As long as you follow the guidelines, you can't mess up.

Running the Program

After typing in listings 1 and 2, save them on a blank formatted disk. Then run the program in Listing 2. This program sets up the default color values for *ColorBase*. After completing these steps, run the database program.

The Main Menu

When you run *ColorBase*, the title screen appears and the default colors are loaded. When the computer is finished, a main menu appears that looks like this:

```
C - CREATE DATABASE
M - MAINTAIN DATABASE
S - SCREEN DEFAULT
X - EXIT TO BASIC
```

The X option simply lets you exit to BASIC. The computer checks with you before doing so.

Designing Your Database

First of all, decide what you want to keep track of. *ColorBase* keeps track of anything you want as long as you allow enough room in the entry field. A field is simply a section on the form where you enter data. For example, if you want names to be in your records, type in `NAME` with the desired amount of mark spaces (explained later). When the records come on the screen, you are able to enter data. *ColorBase* allows entries to be as long as the entered number of mark spaces. Anywhere you put a mark space, the computer lets you enter data at that same place. When you decide what data you will track, select C from the main menu.

C — Create Form

Selecting this option brings up the current data form you are working on. Use this data form to enter your field labels. Although not required on the disk, always save a copy using the S option in case you ever want to reorganize your records to include another field.

Once the form is brought up, a small cursor appears in the center of the screen. Use the arrow keys to move this cursor around. For example, let's say you want a database that holds names and phone numbers. Use the arrow keys to move to a spot that you select and type in something like `NAME`. Under that you might enter `PHONE`. If you are making a receipt database, you may want to put stars around the whole thing and your address at the top. Dress it up — you can type any characters you want on the form.

Once you are finished putting in the items, go back and fill in the mark spaces. To create one, press CTRL. The output looks like a small dash. You will put these where you want, one for each character to be entered. For example, if you were still using the Name item and wanted to be able to enter up to 40 characters for the name, you would go next to `NAME` and put in 40 mark spaces by pressing CTRL 40 times.

The only thing the computer sees is the mark spaces and their positions. Keep in mind you can keep track of only 255 data characters. When you try to make your database, the computer gives you a message saying there are too many mark spaces if you have exceeded this limit.

Once you are finished with your form, press CLEAR to return to the `CREATE` menu.

D — Directory

This function, also available in the Maintain Database menu, displays the directory. If you look at the `REM` statements in the program, you'll see you can change the value of one variable to select between a normal directory and a wide directory.

V — Verify Disk

This verifies your disk and causes a System Error if the disk is faulty. Make sure your form is saved before using this option.

K — Kill

Prompts you to enter a filename and kills that file.

Shane Messer is 14 years old and has worked on the CoCo for two years. He enjoys studying math, science and playing soccer. He may be contacted at 3625 Orange Ave., Fort Pierce, FL 34947.

R — Rename

Allows you to input two names and then renames the first to the second.

S — Save

Saves data form currently in memory to disk.

L — Load

Loads a previously created data form from disk.

E — Erase Form

If you are not happy with your current form and want to start over, press this key and answer Yes to the prompt. The computer erases the form so you can start over.

M — Make Database

When you are ready to create your database from the form, press M. The computer converts your data form into a database form. The database form contains the data form and infomation about it, such as the location and size of entry fields. This process can take up to one minute so be patient.

If your form is legal (that is, having less than 255 entry characters), *ColorBase* responds with a prompt that asks you to enter the name of your database form. Remember, this is not your data form; you will need this file and your database file to run the database. The other form is for your records only. Type in the name and verify your save. The computer responds with a prompt asking if you want to create a database. From here you should answer Yes, and with the next prompt enter the actual name of your database. This is where your records will be held.

X — Exit to Main Menu

Exits back to the Main menu.

Maintaining Your Database

Once you have the database form and database files saved to disk, you are ready to start entering data. Press M from the Main menu and enter the name of your data form and data file that you have saved to disk. A new menu appears and the total number of records is displayed at the bottom.

A — Add a Record

This is where you actually enter your data. Press A and the computer loads your form from disk and displays it on the screen.

You can see the cursor at the first entry field before your data is entered. Enter your data, keeping in mind the left arrow key can be used as a backspace. When you are finished with the first entry field, press ENTER and the computer goes to the next field. Continue this process until you are done with the record.

If at any time you accidentally press ENTER or forget a character, you can use the up and down arrow keys to move the cursor around the different entry fields to correct the mistake.

When you are finished with the record, press CLEAR. The computer verifies your save and asks if you want to enter more records. Respond accordingly.

If you decide to continue adding records, the form reappears with empty entry fields awaiting entry of data again. Your first records, if you verified your save, are stored on disk.

If you answer No to the prompt to enter a new record, you are returned to the menu. If you verified your save of the previous record, the number of records is increased.

S — Search Records

Whenever you decide to look through the records you have saved, just press S. Your form pops up again and you can start moving through the records. Most of the commands, seen by pressing ENTER at the Search mode, are pretty self-explanatory, so I will explain only one of them. When you kill a record, all succeeding records are moved back one to take its place.

The Search feature works a little differently from the Search features with which you might be familiar. First, the computer prompts you for the search string. After you enter the string of characters you want to find (such as a name), all the records beginning with the current record are searched for that string. When the string is found, the computer jumps to that record. If you want to find the next occurrence, press the space bar. If *ColorBase* cannot find the string, it will respond accordingly.

P — Printing Your Records

If you have a printer and want to print your records, press P from the menu. The computer asks which record is to be printed. If you want all of them printed, enter an asterisk (*). Next, it asks whether to send a line feed or not. If so, the computer prints one record per page. Each printed record is 24 lines long, even if you only have one entry field.

When typing in Listing 1, make sure to set the baud rate to half that expected by your printer (Line 120). To do this, use the next highest value for the poke to Location 150. *ColorBase* keeps the computer in the high speed during printing.

X — Exit Back to Main Menu

This takes you back to the Main menu.

Customizing Colors

If you don't like the colors set up by the customization files created by Listing 2, you can change them. This is also self-explanatory. Please make sure to save your changes to disk if you want to keep the new colors.

This may all seem a bit complicated to new computer owners. But if you follow these instructions, you should have no trouble setting up your database. Feel free to modify the program to add any features you want. If you add a really good feature, think about sending it to THE RAINBOW so the editors can share it with other users. ❑

BAUD = 2400

Welcome to the *NEW*
home of the ***BARGAINS!***

512k upgrade - $74.95!!

prime 120ns DRAM, FREE SOFTWARE including
RAMtest, RAMdisk, spooler, 90-day warranty.
Add $3 shipping.

Magnavox 8CM515 Monitors
$249 !!

includes mfgr.'s 2-yr. warranty. CoCo-3
cable -$10. Add $12 shipping.

We also carry a WIDE variety of gently used software (originals w/docs ONLY) and hardware. For a current listing, send $3.00 (refundable 1st order), or call our BBS at (313)663-6207 (5 lines, 3-1200, 7-E-1, online ordering with VISA/MC). INCREDIBLE SAVINGS - **CALL TODAY !!**

COCOPRO!

1334 Byron
Ypsilanti, MI 48198
(313)481-DAVE

We accept VISA, MASTERCARD, Checks, and Money Orders. Credit Card orders, please add 5% to total. All orders shipped same day via UPS Ground. C.O.D. orders add $4.00.

60	136
90	242
140	137
180	202
270	107
320	139
400	146
490	42
550	27
660	59
750	114
810	124
870	65
911	161
970	157
1040	139
1120	168
1170	105
1250	217
1300	206
1302	193
1340	135
1410	53
1470	246
1510	197
1580	144
1640	13
1750	175
1830	227
1920	239
2000	215
2060	55
2090	146
2140	33
2200	71
2290	247
2330	250
2350	52
2400	135
2450	134
2510	87
2580	43
2640	106
2690	242
2750	60
2800	149
2850	140
2890	107
2930	13
2990	192
END	215

Listing 1: COLRBASE

```
0 ' COPYRIGHT 1990 FALSOFT, INC
1 CLEAR 5000
10 GOSUB 2300
20 GOTO 60
30 IF PEEK(341)=247 THEN Y=Y-1:R
ETURN:ELSE IF PEEK(342)=247 THEN
 Y=Y+1:RETURN:ELSE IF PEEK(343)=
247 THEN X=X-1:RETURN:ELSE IF PE
EK(344)=247 THEN X=X+1:RETURN
40 IF CO=1 THEN RETURN
50 FOR TZ=1 TO 1:FOR TX=338 TO 3
45:POKE TX,255:NEXT TX,TZ:A$=INK
EY$:IF A$="" THEN 50 ELSE RETURN
60 '                          Co
lorBase v1.00

          Written by Shane Messe
r
                   Copyright (c)
 1989, All Rights Reserved
70 '
80 '
90 PCLEAR1:FILES 1,400:DIM CX(10
0),CY(100),CN(100),DF$(23),FM$(2
4),N$(100),S$(100),SF$(75),K$(10
0):DW=1 '0= REGULAR DIRECTORY, 1
= WIDE DIRECTORY WITH NAMES AND
EXTENSIONS
100 ON ERR GOTO 2990
110 FF$=CHR$(12) ' FORMFEED FOR
DMP-132
120 POKE 150,40 ' HALF YOUR BAUD
 RATE
130 LO=65496:HI=65497:FW=32:'THI
S WILL BE THE WIDTH OF THE SCREE
N UPON EXITING
140 FORM2=1 TO 24:FM$(M2)=STRING
$(80," "):NEXTM2:KK=1:CMP:GOSUB
1960:FOR M1=32 TO 122:AC$=AC$+CH
R$(M1):NEXT:MID$(AC$,63,1)=CHR$(
127):GOSUB2340:WIDTH 80:CLSS1:AT
TR S2,S3:PALETTE 10,S4:PALETTE 4
,S5:IF KK=1 THEN PLAY"T255L25501
":K$="C":ELSE K$=""
150 '---------------------------
--------------------------------
-----------------

160 '
170 GOSUB 1980
180 GOSUB 2150:IF ASC(A$)=12 THE
N 220
190 GOSUB 2160:IF M1>0 THEN 200
ELSE 180
200 ON M1 GOTO 220,950,1670,1900
210 '---------------------------
220 'CREATE
230 POKE HI,0:GOSUB 2090
240 GOSUB 2150:GOSUB 2160:IF M1>
0 THEN 250 ELSE 240
250 IF M1=10 THEN 160
260 ON M1 GOTO 270,390,430,460,5
10,550,610,690,750
270 'CREATE FORM
280 CLS:FOR M1=0 TO 22:PRINT FM$
(M1+1);:NEXT:LOCATE 0,23:PRINT"
   Use Arrow keys to move around
 page.     Press 'CLEAR' to ret
urn to menu.";
290 X=40:Y=11
300 GOSUB 30:IF ASC(A$)=12 THEN
220
301 IF A$=CHR$(13) THEN X=1:Y=Y+
1
310 IF PEEK(342)=191 THEN A$=CHR
$(127)
320 IF INSTR(AC$,A$)>0 THEN LPOK
E 442368+(X-1)*2+Y*160,ASC(A$):M
ID$(FM$(Y+1),X,1)=A$:X=X+1:PLAY
K$
330 IF X>80 THEN X=1
340 IF Y>22 THEN Y=0 ELSE IF Y<0
 THEN Y=22
350 IF X<1 THEN X=80
360 LOCATE X-1,Y
370 GOTO 300
380 GOTO 230
390 'DIRECTORY
400 IF DW=0 THEN CLS:POKE LO,0:D
IR:PRINT"Free ->";FREE(0):GOSUB
50:POKE HI,0
410 IF DW=1 THEN GOSUB 2770
420 GOTO 230
430 'VERIFY
440 POKE LO,0:FOR M1=0 TO 34:FOR
 M2=1 TO 18:DSKI$ DR,M1,M2,M1$,M
2$:NEXT M2,M1:POKE HI,0
450 GOTO 230
460 'KILL FORM
470 M$="Kill Form":GOSUB 2140
480 GOSUB 2180:IF F$="" THEN 230
490 PRINT"     Kill "F$" Are you
 sure";:LINEINPUT"? Y/N ->";C$:I
F C$="Y" THEN POKE LO,0:KILL F$:
POKE HI,0:GOTO 230 ELSE 230
500 GOTO 230
510 'RENAME FORM
520 PRINT:PRINT:PRINT"    SOURCE
":GOSUB 2180:IF F$<>"" THEN 530
 ELSE 540
530 J$=F$:PRINT:PRINT:PRINT"
DESTINATION":GOSUB 2180:IF F$<>"
" THEN RENAME J$ TO F$
540 GOTO 230
550 'SAVE FORM
560 M$="Save Form":GOSUB 2140
570 GOSUB 2180:IF F$="" THEN 230
580 POKE LO,0:OPEN "O",#1,F$
590 FOR T=1 TO 23:WRITE #1,FM$(T
):NEXT:CLOSE:POKE HI,0
600 GOTO 230
610 'LOAD FORM
620 M$="Load Form":GOSUB 2140
630 GOSUB 2180:IF F$="" THEN 230
640 POKE LO,0:OPEN "I",#1,F$
650 FOR T=1 TO 23:INPUT #1,FM$(T
):NEXT:CLOSE:POKE HI,0
660 GOTO 230
670 GOTO 230
680 GOTO 230
690 'ERASE FORM
700 M$="Erase Current form":GOSU
B 2140
710 PRINT"                Do you
 really wish to erase the curren
t form? Y/N"
720 GOSUB 2150:IF A$="Y" THEN 73
0 ELSE 230
730 FOR T=0 TO 22:FM$(T)=STRING$
(80," "):NEXTT:GOTO 230
740 GOTO 230
750 'MAKE DATABASE
760 FC=0:M$="Make Database":GOSU
B2140
770 PRINT"                  Conv
```

In 1989,

Color Computer users
just like you
from across North America
described their
dream computer to us.

In 1990,

Kenneth-Leigh Enterprises and
a team of engineers and
developers will introduce
the computer you demanded.

Write to us for details
and join the celebration!

Tell me more about the new computer!
NAME ______________________
ADDRESS ______________________
CITY/STATE/ZIP ______________________

Mail to: Kenneth-Leigh Enterprises
Suite 10
1840 Biltmore Street NW
Washington, DC 20009

Tandy products are registered trademarks of Tandy Corporation, Copyright © 1990, Kenneth-Leigh Enterprises.

```
erting data to database form. Pl
ease wait ..."
780 FOR T=1 TO 23
790 N=INSTR(FM$(T),CHR$(127)):IF
 N=0 THEN DF$(T)=FM$(T):NEXT
800 IF N>0 THEN NI=NI+1:CX(NI)=N
:CY(NI)=T:FOR WA=N TO 79:IF MID$
(FM$(T),WA,1)=CHR$(127) THEN CN(
NI)=CN(NI)+1:MID$(FM$(T),WA,1)="
 ":NEXT WA:ELSE
810 IF T=24 THEN 830
820 GOTO 790
830 FOR T=1 TO NI:FC=FC+CN(T):NE
XT T:IF FC>255 THEN PRINT" Sorry
! You have too many entries! Ple
ase re-edit!":GOSUB 50:GOTO 230
840 PRINT:PRINT"
                    Done!"
850 PRINT:PRINT"    You are read
y to save your database form. (D
EFAULT is DATAFORM.DAT)
860 GOSUB 2180:IF F$="" THEN F$=
"DATAFORM.DAT"
870 PRINT:PRINT"       Save "F$"
to disk? Y/N ->";
880 LINEINPUT A$:IF A$="Y" THEN
890 ELSE 230
890 POKE LO,0:OPEN"O",#1,F$
900 WRITE #1,NI:FOR T=1 TO NI:WR
ITE #1,CX(T),CY(T),CN(T):NEXT:FO
R T=1 TO 23:WRITE #1,DF$(T):NEXT
:CLOSE:POKE HI,0
910 LINEINPUT"       Use form to
create a database? Y/N ->";A$:IF
 A$="Y" THEN POKE LO,0:OPEN"O",#
1,"MISC.DAT":WRITE #1,0:CLOSE:GO
SUB 912:GOSUB 2180:IF F$="" THEN
 F$="DATABASE.DAT":OPEN"O",#1,F$
:CLOSE:GOTO 230:ELSE OPEN"O",#1,
F$:CLOSE:GOTO 230
911 GOTO 920
912 PRINT"    You are ready to c
reate your database. (DEFAULT is
 DATABASE.DAT)":RETURN
920 GOTO 230
930 GOTO 230
940 '--------------------------
950 'MAINTAIN
960 SW=0:PRINT"     Please enter
 then name of your database form
 (DEFAULT is DATAFORM.DAT)":GOSU
B2180:IF F$="" THEN D1$="DATAFOR
M.DAT" ELSE D1$=F$
970 PRINT"     Please enter the
 name of your database file (DEF
AULT is DATABASE.DAT)":GOSUB 218
0:IF F$="" THEN D2$="DATABASE.DA
T" ELSE D2$=F$
980 GOSUB 2350
990 CLOSE:GOSUB 2060
1000 PRINT:PRINT:PRINTM$"No. of
records ->";NF
1010 GOSUB 2150:GOSUB 2160:IF M1
>0 THEN 1020 ELSE 1010
1020 IF M1=6 THEN 160
1030 ON M1 GOTO 1040,1210,1370,1
540,1590
1040 'ADD
1050 GOSUB 2360
1060 CLS:FOR T=1 TO 23:PRINT DF$
(T);:NEXT
1070 PRINT"
         Press 'CLEAR' to leave."
;
1080 C=1
1090 IF C<1 THEN C=1:ELSE IF C>N
I THEN C=NI
1100 GOSUB 2380
1110 IF N$(C)>"" THEN PRINT N$(C
);
1120 GOSUB 50
1130 IF ASC(A$)=13 THEN LOCATE C
X(C)-1,CY(C)-1:PRINT STRING$(CN(
C)," ");:LOCATE CX(C)-1,CY(C)-1:
PRINT N$(C);:PRINTMID$(DF$(CY(C)
),CX(C)+CN(C),1);:C=C+1:GOTO 109
0
1140 IF ASC(A$)=94 THEN C=C-1:GO
TO 1090
1150 IF ASC(A$)=12 THEN 2400
1160 IF INSTR(AC$,A$)>0 AND LEN(
N$(C))<RM THEN PRINT A$;:N$(C)=N
$(C)+A$
1170 IF ASC(A$)=8 AND LEN(N$(C))
>0 THEN N$(C)=LEFT$(N$(C),LEN(N$
(C))-1):GOSUB 2380:PRINT STRING$
(CN(C)," ");:GOSUB 2380:PRINT N$
(C);
1180 GOTO 1120
1190 GOTO 990
1200 '--------------------------
1210 'SEARCH
1220 SW=0
1230 GOSUB 2360:CLS:GOSUB 2600
1240 IF XX<1 THEN XX=1 ELSE IF X
X>NF THEN XX=NF
1250 SW=SW+1:IF SW=1 THEN GOSUB
2570:ELSE GET #1,XX:V$(1)=K$(1):
GOSUB 2850:FOR T=1 TO NI:LOCATE
CX(T)-1,CY(T)-1:PRINT S$(T);:NEX
T:POKE HI,0
1260 IF SW=1 THEN 1250
1270 LOCATE 0,23:PRINT"
 <ENTER> for Commands. <Clear> T
o quit. Rec no.->";XX;
1280 GOSUB 50
1290 IF ASC(A$)=94 THEN XX=XX+10
:GOTO 1240:ELSE IF ASC(A$)=10 TH
EN XX=XX-10:GOTO 1240:ELSE IF AS
C(A$)=8 THEN XX=XX-1:GOTO 1240 E
LSE IF ASC(A$)=9 THEN XX=XX+1:GO
TO 1240
1300 IF A$="S" THEN LOCATE 0,23:
PRINT STRING$(78," ");:LOCATE 0,
23:LINEINPUT "Search for what st
ring? ->";S$:IF S$="" THEN A$="
":GOSUB 2880:GOSUB 5000:GOTO 130
2 ELSE IF S$<>"" THEN GOSUB 2880
:GOSUB 5000:IF REC > NF THEN 130
2
1301 IF Z>NF THEN 1302 ELSE IFA$
="S"THENLOCATE0,23:PRINT"Press <
SPACE> to go to next occurence o
r <ENTER> to exit. RECORD:";Z;:E
XEC44539:Z$=INKEY$:IFZ$=" "THENX
X=XX+1:IF XX>NF THEN 1302 ELSE G
OSUB2880:GOSUB5000:GOTO 1301
1302 LOCATE 0,23:PRINTSTRING$(75
," ");
1310 IF A$="K" THEN LOCATE0,23:P
RINT STRING$(78," ");:LOCATE 0,2
3:PRINT"        Delete current
record? Are you sure?";:GOSUB 50
:IF A$="Y" OR A$="y" THEN GOSUB
2570:IF T=NF THEN GOSUB 3000 ELS
E FOR T=XX TO NF-1:GET#1,T+1:PUT
 #1,T:NEXT:NF=NF-1:GOSUB
1320 IF A$="F" THEN XX=1:GOTO 12
40:ELSE IF A$="L" THEN XX=NF:GOT
O 1240
1330 IF ASC(A$)=12 THEN 990
1340 IF ASC(A$)=13 THEN GOSUB 26
10:GOTO 1240
1350 GOTO 1240
1360 '--------------------------
1370 'EDIT
1380 LOCATE 0,18:LINEINPUT"Which
 record to edit? ->";E$:E=VAL(E$
):IF E<1 OR E>NF THEN 990
1390 GOSUB 2360:GOSUB 2570:GET #
1,E:V$(1)=K$(1):GOSUB 2850:FOR T
=1 TO NI:N$(T)=S$(T):NEXT
1400 CLS:FOR T=1 TO 23:PRINT DF$
(T);:NEXT:FOR T=1 TO NI:LOCATE C
X(T)-1,CY(T)-1:PRINT N$(T);:NEXT
 T
1410 LOCATE 0,23:PRINT"
                  Press 'CLEAR
' to leave.";
1420 C=1
1430 IF C<1 THEN C=1:ELSE IF C>N
I THEN C=NI
1440 GOSUB 2380
1450 IF N$(C)>"" THEN PRINT N$(C
);
1460 GOSUB 50
1470 IF ASC(A$)=13 THEN LOCATE C
X(C)-1,CY(C)-1:PRINT STRING$(CN(
C)," ");:LOCATE CX(C)-1,CY(C)-1:
PRINT N$(C);:PRINTMID$(DF$(CY(C)
),CX(C)+CN(C),1);:C=C+1:GOTO 143
0
1480 IF ASC(A$)=94 THEN C=C-1:GO
TO 1430
1490 IF ASC(A$)=12 THEN OO=1:GOT
O 2400
1500 IF INSTR(AC$,A$)>0 AND LEN(
N$(C))<RM THEN PRINT A$;:N$(C)=N
$(C)+A$
1510 IF ASC(A$)=8 AND LEN(N$(C))
>0 THEN N$(C)=LEFT$(N$(C),LEN(N$
(C))-1):GOSUB 2380:PRINT STRING$
(CN(C)," ");:GOSUB 2380:PRINT N$
(C);
1520 GOTO 1460
1530 GOTO 990
1540 'DIRECTORY
1550 IF DW=0 THEN POKE HI,0:CLS:
DIR:PRINT"Free ->";FREE(0):GOSUB
 50:POKE LO,0:GOTO 990
1560 IF DW=1 THEN GOSUB 2770
1570 GOTO 990
1580 GOTO 990
1590 'PRINT
1600 CLS:M$="Print record(s)":GO
SUB 2140:PRINT:PRINT:PRINT:LINEI
NPUT"WHICH RECORD TO PRINT ('*'
FOR ALL) ->";N$:IF N$="*" THEN 1
620
1610 IF VAL(N$)<1 OR VAL(N$)>NF
THEN 1650
1620 LINEINPUT"FORMFEEDS? ->";YF
$:PRINT"PRESS ANY KEY TO BEGIN..
...":GOSUB 50
1630 IF N$="*" THEN FOR FF=1 TO
NF:GOSUB 2900:NEXT FF:GOTO 1650
1640 FF=VAL(N$):GOSUB 2900
1650 GOTO 990
1660 '---------------------------
-
1670 'SETUP
1680 GOSUB 2020
1690 GOSUB 2150:GOSUB 2160:IF M1
>0 THEN 1700 ELSE 1690
1700 IF M1=3 THEN 160
1710 ON M1 GOTO 1720,1850
1720 'SET DISPLAY
1730 CO=1:X=S4:Y=S5
1740 M$="Setup Display":GOSUB 21
40
1750 LOCATE 10,5:PRINT"Foregroun
```

```
d ->"S4
1760 LOCATE 10,6:PRINT"Backgroun
d ->"S5
1770 LOCATE 15,8:PRINT"Press 'EN
TER' to exit."
1780 IF INKEY$=CHR$(13) THEN CO=
0:GOTO 1680
1790 GOSUB 30:S4=X:S5=Y
1800 IF S5>63 THEN S5=0 ELSE IF
S5<0 THEN S5=63
1810 IF S4>63 THEN S4=1 ELSE IF
S4<0 THEN S4=63
1820 X=S4:Y=S5
1830 PALETTE 4,S5:PALETTE 10,S4
1840 GOTO 1750
1850 'SAVE DEFAULT
1860 POKE LO,0:OPEN "O",#1,"SETU
P":WRITE #1,S1,S2,S3,S4,S5:CLOSE
:POKE LO,0
1870 GOTO 1670
1880 GOTO 160
1890 '------------------------
-
1900 'EXIT
1910 M$="Exit":GOSUB 2140:PRINT"
                    Do you really
 wish to exit? (Y/N) ->":GOSUB 2
150
1920 IF A$="Y" THEN CLS:WIDTH FW
:END:ELSE 160
1930 GOTO 160
1940 '------------------------
--------------------------------
----------------
1960 POKE LO,0:OPEN"I",#1,"SETUP
":INPUT #1,S1,S2,S3,S4,S5:CLOSE:
POKE HI,0:RETURN
1970 'PRINT MENU 1
1980 M$=" Main Menu ":GOSUB 2140
1990 M$=STRING$(30," ")
2000 PRINT M$"C - Create Databas
e":PRINTM$"M - Maintain Database
":PRINTM$"S - Screen Dafault":PR
INTM$"X - Exit Program to BASIC"
:SL$="CMSX"
2010 RETURN
2020 'PRINT MENU 2
2030 M$="Setup Display":GOSUB 21
40:M$=STRING$(30," "):PRINTM$"C
- Customize Display":PRINTM$"S -
 Save Default":PRINTM$"X - Exit
to Main Menu":SL$="CSX":RETURN
2040 RETURN
2050 'PRINT MENU 3
2060 M$="Maintain Database":GOSU
B 2140:M$=STRING$(30," "):PRINTM
$"A - Add Record":PRINTM$"S - Se
arch records":PRINTM$"E - Edit R
ecord":PRINTM$"D - Directory":PR
INTM$"P - Print Record":PRINTM$"
X - Exit to Main Menu":SL$="ASED
PX":RETURN
2070 RETURN
2080 'PRINT MENU 4
2090 M$="Create Database":GOSUB
2140:M$=STRING$(30," "):PRINTM$"
C - Create Form":PRINTM$"D - Dir
ectory":PRINTM$"V - Verify Disk"
:PRINTM$"K - Kill Form":PRINTM$"
R - Rename Form":PRINTM$"S - Sav
e Form":PRINTM$"L - Load Form":S
L$="CDVKRSLEMX"
2100 PRINTM$"E - Erase current f
orm":PRINTM$"M - Make Database":
PRINTM$"X - Exit to main menu":R
ETURN
2110 RETURN
2120 'PRINT MENU 5
2130 RETURN
2140 ATTR 2,4:CLS:M1=LEN(M$):M1=
80-M1:M1=INT(M1/2):ATTR 3,2:PRIN
TSTRING$(M1-1," ");:ATTR S2,S3,U
:PRINTM$" ";:ATTR 3,2:PRINT:PRIN
T:ATTR 2,4:PRINT:PRINT:RETURN
2150 EXEC 44539:A$=INKEY$:PLAY"T
10L1004A":RETURN
2160 M1=INSTR(SL$,A$):RETURN
2170 '------------------------
------------------------
----------------
2180 LINEINPUT"    PLEASE INPUT
THE FILENAME->";F$
2190 IF F$="" THEN RETURN
2200 IN=INSTR(F$,"."):IM=INSTR(F
$,"/")
2210 IF (IN OR IM)<1 AND LEN(F$)
>8 THEN 2280
2220 IF (IN OR IM)<1 THEN F$=F$+
".DAT"
2230 IF IM>1 THEN MID$(F$,IM,1)=
"."
2240 IF LEN(F$)-INSTR(F$,".")>3
```

MLBASIC 2.0 - BASIC Compiler

If you want your BASIC programs to run up to 50 times faster, or want more programming features without learning another language, MLBASIC is for you.

MLBASIC is the most compatible BASIC compiler available for the Color Computer. WHY? Because MLBASIC fully supports:

- Low- and high-resolution graphics
- All types of I/O (disk, screen, printer, RS232)
- All available commands offered with BASIC
- Floating point functions and expressions
- Integer, floating point and string type variables and arrays
- Use of all available 512K RAM in the COCO 3
- 80,40 or 32 column text displays

MLBASIC not only contains everything that you would expect a BASIC programming language should contain, MLBASIC has features that offer flexibility of other languages like C, Pascal, FORTRAN and even assembly language. These features will allow programmers to directly access the CPU registers on the COCO, produce modular program code with SUBROUTINES, manipulate memory in blocks, and even call ROM routines in other areas of memory.

MLBASIC revision 2.0 has incorporated all enhancements that were suggested by MLBASIC 1.0 users and more. Revision 2.0 did away with all the incompatibility problems that existed with revision 1.0.

MLBASIC allows for the first time user to quickly compile a program using default compiler settings. The advanced user has the capability of controlling over a dozen settings which control where the program is compiled, which medium to compile to (memory or disk), string space, compiler listings and more.

With all this going for MLBASIC, your might expect the cost to be a little out of your budget. After looking at prices of other BASIC compilers for the COCO 3 you might be correct. But look again at this ad; for only $59.95, you can have a programming language that will spark your interest once again in the COCO.

Before you buy another BASIC compiler for the COCO, find out if it supports everything MLBASIC supports. Then look at the price tag. We feel that it won't be long before you place an order for MLBASIC.

"MLBASIC is a fine program for any serious programmer," *said David Gerald in the December 1987* RAINBOW.

<<<< **ONLY $59.95** >>>>

COCO 3 WITH DISK REQUIRED -Add $4.00 Postage.
Check, Money Order or COD accepted
Foreign orders use U.S. MONEY ORDERS only.

WASATCHWARE
7350 Nutree Drive
Salt Lake City, Utah 84121
Phone (801) 943-1546

Nine-Times

The first magazine devoted exclusively to OS-9!

Every other month you will receive a disk *jam-packed* with programs and articles *all* for **OS-9**.

Each issue contains: 10 helpful and useful programs to help build your OS-9 library * Instructions, examples, and samples of Basic09 procedures and subroutines to help with your own programs and your understanding of Basic09 * C programs and programming examples * Program reviews, Hints, Help columns, and informative articles to advance your knowledge of OS-9 * Supplied totally of 5.25" disk * Bound manual sent to each new subscriber for help in getting *Nine-Times* up and running, as well as tips on using it with a ram disk or hard disk * All graphic/joystick interface for ease of use.

1-Year Subs, $34.95 Canadian postage, add $1.00
Foreign postage, add $7.00

Back Issues: Available for the May, July, Sept., and Nov. 1989, & Jan. 1990 issues. Please write for information on Back Issue contents.

Back Issue, ea. $7.00 Foreign postage, add $1.50 ea.

Magazine Source: Due to many inquiries, the source code for the magazine graphic shell is being provided as an informational tool. Included is the actual Basic09 source code and compiled modules on disk, as well as documentation and a printed copy of the source code.

Source, $24.95 Foreign postage, add $1.50

To order, please send U.S. check or money order to:
JWT Enterprises
5755 Lockwood Blvd.
Youngstown, OH 44512

Technical Assistance:
(216)-758-7694

Sorry, no C.O.D.'s; Foreign & Canadian orders, *please* use **U.S. money orders**.
U.S. checks, allow 3 weeks for receipt of first issue/back issue.

Copyright (C) 1989 OS-9 is a trademark of Microware Systems Corp. and Motorola, Inc.

We Cannot Tell A Lie

Lonnie's gone nuts!! He's chopped down prices on Rainbow Bookshelf items!

The Complete Rainbow Guide to OS-9

Authors Dale Puckett and Peter Dibble show how to take advantage of OS-9's multitasking and multiuser features. An easy-to-read, step-by-step guide packed with hints, tips, tutorials and free software in the form of program listings.
Book $12.95, Disk Package $19.95 (2 disks, book not included) — a savings of up to 36%!

SAVE 38%! Book and disks only $29.95

The Rainbow Book of Simulations

*20 award-winning entries from THE RAINBOW's first Simulations contest. You are a Civil War Commander, an air traffic controller, a civil defense coordinator, or a scientist on Mars . . . your wits are on the line.
Book $3.50, Tape $3.50 — a savings of 65%!

SAVE 70%! Book and tape only $6

The Second Rainbow Book of Simulations

The 16 winners from our second Simulations contest. Fly through dense African jungle, bull your way down Wall Street, lead a bomb squad, or try your hand at Olympic events. Test your skills and talents.
Book $4.95, Tape or Disk $4.95 — a 50% savings!

SAVE 55%! Book and tape only $8.95
SAVE 57%! Book and disk only $8.95

SAVE UP TO 70%

The First Rainbow Book of Adventures

Contains 14 winning programs from our first Adventure contest. Includes *Sir Randolph of the Moors, Horror House, One Room, Dr. Avaloe* and more. Plus hints, tips on solving Adventures.
Book $2, Tape $2 — a 43% savings!

SAVE 50%! Book and tape only $3.50

The Second Rainbow Book of Adventures

Featuring 24 of the most challenging Adventure games ever compiled. Meet the Beatles and battle the Blue Meanies, find a hidden fortune, or win the heart of a mysterious princess. *Ring Quest, Secret Agent Man, Dark Castle, Curse of Karos* and more!
Book $6.95, Tape $6.95 — a 50% savings!

SAVE 57%! Book and tape only $11.95

The Third Rainbow Book of Adventures

The excitement continues with 19 new Adventures. Discover backstage intrigue at the London Theatre, attempt a daring space rescue, or defeat evil in the year 2091 as a genetic android. *Evil Crypt, Spymaster, Time Machine, The Amulet*, and that's only the beginning!
Book $6.95, Tape $6.95, Two-Disk Set $7.95 — a savings of up to 47%!

SAVE 45%! Book and tape only $11.95

SAVE 52%! Book and disk only $12.95

The Rainbow Introductory Guide to Statistics

Dr. Michael Plog and Dr. Norman Stenzel give a solid introduction to the realm of statistical processes and thinking for both the beginner and the professional. (80-column printer required.)
Book $2.95, Tape or Disk $2.95 — a savings of 54%!

SAVE 62%! Book and tape or disk only $4.95

Name ______________________________
Address ______________________________
City ______________________________
State ____________________ ZIP __________
☐ Payment Enclosed, or ☐ Charge to:
☐ VISA ☐ MasterCard ☐ American Express
Account Number ______________________________
Card Expiration Date ______________________________
Signature ______________________________

Please send me:

☐ **The Rainbow Book of Simulations** (first)	~~$ 9.95~~ $ 3.50 ________
☐ Rainbow Simulations Tape(first)	~~$ 9.95~~ $ 3.50 ________
☐ First Simulations Package	~~$19.90~~ ~~$11.95~~ $ 6.00 ________
☐ **The Second Rainbow Book of Simulations**	~~$ 9.95~~ $ 4.95 ________
☐ Second Rainbow Simulations Tape	~~$ 9.95~~ $ 4.95 ________
☐ Second Rainbow Simulations Disk	~~$10.95~~ $ 4.95 ________
☐ Second Simulations Package with Tape	~~$19.90~~ ~~$12.95~~ $ 8.95 ________
☐ Second Simulations Package with Disk	~~$20.90~~ ~~$13.95~~ $ 8.95 ________
☐ **The Complete Rainbow Guide to OS-9**	~~$19.95~~ ~~$16.95~~ $12.95 ________
☐ Rainbow Guide to OS-9 Disk Set (2 disks)	~~$31.00~~ $19.95 ________
☐ Rainbow Guide to OS-9 Package	~~$47.95~~ ~~$36.95~~ $29.95 ________
☐ **The Windows & Applications Disk for** The Complete Rainbow Guide to OS-9 Level II, Vol. I	$19.95 ________
☐ **The Rainbow Book of Adventures** (first)	~~$ 7.95~~ ~~$ 3.50~~ $ 2.00 ________
☐ Rainbow Adventures Tape (first)	~~$ 7.95~~ ~~$ 3.50~~ $ 2.00 ________
☐ First Adventure Package	~~$15.90~~ ~~$ 7.00~~ $ 3.50 ________
☐ **The Second Rainbow Book of Adventures**	~~$13.95~~ $ 6.95 ________
☐ Second Rainbow Adventures Tape	~~$13.95~~ $ 6.95 ________
☐ Second Adventure Package	~~$27.90~~ ~~$17.95~~ $11.95 ________
☐ **The Third Rainbow Book of Adventures**	~~$11.95~~ $ 6.95 ________
☐ Third Adventures Tape	~~$ 9.95~~ $ 6.95 ________
☐ Third Adventures Disk Set (2 disks)	~~$14.95~~ $ 7.95 ________
☐ Third Adventure Package with Tape	~~$21.90~~ ~~$15.95~~ $11.95 ________
☐ Third Adventure Package with Disk	~~$26.90~~ ~~$16.95~~ $12.95 ________
☐ **Introductory Guide to Statistics**	~~$ 6.95~~ $ 2.95 ________
☐ Guide to Statistics Tape or Disk (indicate choice)	~~$ 5.95~~ $ 2.95 ________
☐ Guide to Statistics Package (indicate choice of tape or disk)	~~$12.90~~ ~~$ 8.95~~ $ 4.95 ________
Add $2.00 per book Shipping and Handling in U.S.	________
Outside U.S., add $4 per book	________
Kentucky residents add 5% sales tax	________
(Allow 6 to 8 weeks for delivery)	Total ________

Mail to: Rainbow Bookshelf, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. To order by phone (*credit card orders only*) call (800) 847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call (502) 228-4492.

Please note: The tapes and disks offered by The Rainbow Bookshelf are not stand-alone products. That is, they are intended to be an adjunct and complement to the books. Even if you buy the tape or disk, you will still need the appropriate book for loading and operating instructions. OS-9® is a registered trademark of the Microware Systems Corporation.

```
THEN 2280
2250 IF INSTR(F$,"/")>0 THEN 228
0
2260 RETURN
2270 RETURN
2280 PRINT "    BAD FILENAME":SO
UND 1,2:GOTO 2180
2290 '--------------------------
--------------------------------
---------------
2300 POKE 65497,0:WIDTH 40:CLS3:
ATTR 2,4:CLS:LOCATE 0,3:FOR S=1
TO 8:READ C1$:GOSUB 2320:PRINT:N
EXT:POKE 65496,0
2310 RETURN
2320 L=LEN(C1$):L=40-L:L=INT(L/2
):PRINTSTRING$(L," ");C1$:RETURN
2330 DATA ColorBase v1.20,For 12
8k CoCo with disk drive,Written
By Shane Messer,"Copyright (c),
1989",Modified 1/16/90,All Right
s Reserved,Configuring Program,P
lease Wait ...
2340 LOCATE 0,17:PRINT:LOCATE0,1
7:C1$="Done.":GOSUB 2320:PRINT:C
1$="Press any key to continue ..
.":GOSUB2320:PLAY"L20T10O3A":EXE
C 44539:RETURN
2350 CLOSE:POKE LO,0:OPEN "I",#1
,"MISC.DAT":INPUT #1,NF:CLOSE:PO
KE HI,0:RETURN
2360 CLOSE:POKE LO,0:OPEN "I",#1
,D1$:INPUT#1,NI:FOR T=1 TO NI:IN
PUT #1,CX(T),CY(T),CN(T):NEXT:FO
R T=1 TO 23:INPUT #1,DF$(T):NEXT
:CLOSE:POKE HI,0:RETURN
2370 '--------------------------
--------------------------------
---------------
2380 LOCATE CX(C)-1,CY(C)-1
2390 RM=CN(C):LM=1:RETURN
2400 LOCATE 0,23::PRINT"
          Do you wish to save t
his record? <Y/N)";:FOR TX=1 TO
10:FOR TY=338 TO 345:POKE TY,255
:NEXT TY,TX
2410 IF OO=1 THEN GOSUB 50:IF A$
="N" THEN FOR T=1 TO NI:N$(T)=""
:NEXT:GOTO 990
2420 IF OO=1 THEN GOSUB 2480
2430 IF OO=1 THEN OO=0:GOTO 990
2440 GOSUB 50:IF A$="N" THEN FOR
 T=1 TO NI:N$(T)="":NEXT:GOTO 24
50 ELSE GOSUB 2480
2450 LOCATE 0,23:PRINT"
      recordsDo you wish to keep
adding files? <Y/N>";
2460 FOR T=1 TO NI:N$(T)="":NEXT
2470 GOSUB 50:IF A$="N" THEN 990
:ELSE IF A$="Y" THEN 1060 ELSE 2
470
2480 IF OO<>1 THEN NF=NF+1
2490 CLOSE:POKE LO,0:OPEN "D",#1
,D2$,255
2500 S$="":FOR Q=1 TO NI:GOSUB 2
860:S$=S$+N$(Q):NEXT:FIELD #1,25
5 AS K$(1)
2510 LSET K$(1)=S$
2520 IF OO=1 THEN PUT#1,E:CLOSE:
POKE HI,0 ELSE PUT #1,NF:CLOSE:P
OKE HI,0
2530 '
2540 CLOSE:OPEN"O",#1,"MISC":WRI
TE #1,NF:CLOSE:POKE HI,0
2550 RETURN
2560 '--------------------------
--------------------------------
---------------
2570 CLOSE:POKE LO,0:OPEN "D",#1
,D2$,255:FIELD #1, 255 AS K$(1)
2580 RETURN
2590 '--------------------------
--------------------------------
---------------
2600 FOR T=1 TO 23:PRINT DF$(T);
:NEXT:RETURN
2610 '--------------------------
2620 LOCATE 0,0
2630 FOR T=1 TO 23:PRINT STRING$
(80," ");:NEXT:LOCATE 0,0:M$=STR
ING$(20," "):PRINT"          "M$
"SEARCH COMMANDS":PRINT:PRINT
2640 PRINTM$"<ENTER>           -
   Takes you to this menu"
2650 PRINTM$"<CLEAR>           -
   To take you out of search mod
e"
2660 PRINTM$"<DOWN ARROW>      -
   Takes you ten records backwar
ds"
2670 PRINTM$"<UP ARROW>        -
   Takes you ten records forward
"
2680 PRINTM$"<LEFT ARROW>      -
   Takes to back one record"
2690 PRINTM$"<RIGHT ARROW>     -
   Takes you forward one record"
2700 PRINTM$"<K>                -
   Delete the current record"
2710 PRINTM$"<F>                -
   Takes you to first record"
2720 PRINTM$"<L>                -
   Takes you to last record"
2730 PRINTM$"<S>                -
   Searches for entered string"
2740 PRINT:PRINT:PRINT:PRINTM$"
 Press any key to return to sear
ch mode ...":
2750 GOSUB 50:GOSUB 2600:RETURN
2760 '--------------------------
--------------------------------
---------------
2770 POKE LO,0:I=0:S=0:T=0:CLS:F
OR T=3TO11:DSKI$0,17,T,A$,B$:C$=
A$+LEFT$(B$,127):FORQ=1TO255STEP
32:IFMID$(C$,Q,1)=CHR$(0)THEN279
0ELSEIFMID$(C$,Q,1)=CHR$(255)THE
N2800
2780 SF$(I+T-3)=MID$(C$,Q,11):I=
I+1
2790 NEXT Q,T
2800 POKE HI,0:FOR S=0 TO I+3:SF
$(S)=LEFT$(SF$(S),8)+"."+MID$(SF
$(S),9,3):NEXTS:FOR S=0TOI+3:IF
LEN(SF$(S)) <> 1 THEN PRINT "  "
;SF$(S);"  ";:ELSE 2810
2810 NEXTS:PRINT:POKE LO,0:PRINT
"Free ->";FREE(0):POKE HI,0
2820 FOR S=0 TO I+3:SF$(S)="":NE
XT
2830 GOSUB 50
2840 RETURN
2850 POKE 65497,0:PS=1:FOR T=1 T
O NI:S$(T)=MID$(V$(1),PS,CN(T)):
PS=PS+CN(T):NEXT:PS=0:POKE 65496
,0:RETURN
2860 IF LEN(N$(Q))<CN(Q) THEN N$
(Q)=N$(Q)+STRING$(CN(Q)-LEN(N$(Q
))," ")
2870 RETURN
2880 GOSUB 2570:IF XX>NF THEN RE
TURN ELSEFOR Z=XX TO NF:GET #1,Z
:IF INSTR(K$(1),S$)>0 THEN XX=Z:
RETURN
2890 NEXT Z:LOCATE 0,23:PRINT ST
RING$(79," ");:LOCATE 0,23:SOUND
 1,1:ATTR 2,4,B:FOR T=1 TO 10:PR
INT:NEXT T:PRINT"
      SPCIFIED STRING IS NOT ABL
E TO BE LOCATED!":EXEC 44539:ATT
R 2,4:A$=" ":RETURN
2900 'PRINT OUTS
2910 SF=1:GOSUB 2360:GOSUB 2570:
GET #1,FF:V$(1)=K$(1):GOSUB 2850
2920 POKE 65497,0:FOR T=1 TO 23
2930 IF CY(SF)>T OR SF=>NI THEN
PRINT #-2,DF$(T):NEXT T:GOTO 297
0
2940 FOR K=1 TO LEN(DF$(T))
2950 IF CX(SF)=K AND CY(SF)=T TH
EN PRINT #-2,S$(SF);:K=K+LEN(S$(
SF)):SF=SF+1:ELSE PRINT #-2,MID$
(DF$(T),K,1);
2960 NEXT:PRINT#-2:NEXT
2970 IF LEFT$(YF$,1)="Y" THEN PR
INT #-2,FF$
2980 RETURN
2990 WIDTH 40:CLS:PRINT"SYSTEM E
RROR!!":SOUND 1,1:PRINT"ERROR #"
;ERNO" IN LINE ";ERLIN:LINEINPUT
"RERUN PROGRAM? ->";Y$:IF LEFT$(
Y$,1)="Y" THEN RUN ELSE END
3000 A$=STRING$(255," "):LSET K$
(1)=A$:PUT #1,1:CLOSE:NF=NF-1:GO
SUB 2540:RETURN
5000 POKE 65497,0:CLS:GOSUB 2600
:POKE 65496,0:IF XX>NF THEN REC=
NF+1:RETURN ELSE REC=NF-1
5001 GET #1,XX:V$(1)=K$(1):GOSUB
 2850:POKE 65497,0:FOR T=1 TO NI
:LOCATE CX(T)-1,CY(T)-1:PRINT S$
(T);:POKE 65496,0:NEXT:RETURN
```

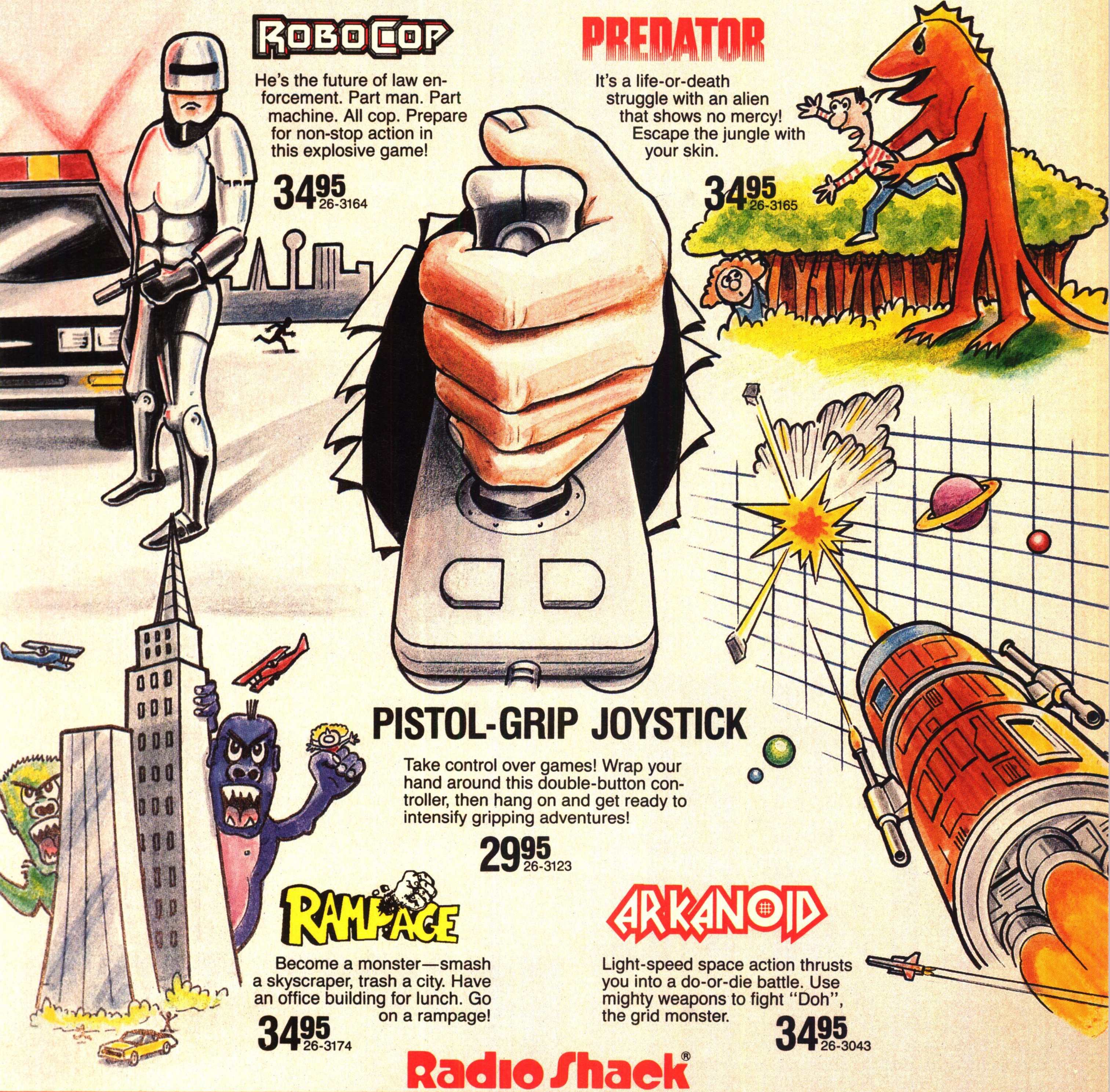
Listing 2: CONFIG

```
0 ‘ COPYRIGHT 1990 FALSOFT, INC
10 ‘ CONFIG FILE CREATOR
20 WIDTH 32:POKE &H95C9,&H57:POK
E &HFF22,&H50
30 GOSUB 80
40 PRINT”   Please insert disk t
o save   the configuration file.
....”:GOSUB 80:GOSUB 90:EXEC 445
39
50 GOSUB 80:PRINT”Thank you! Sav
ing configuration file now....”:
GOSUB 80:GOSUB 90
60 OPEN “O”,#1,”SETUP”:WRITE #1,
3,2,4,0,63:CLOSE
70 GOSUB 80:PRINT”Done....”::GOS
UB 80:END
80 FOR T=1 TO 8:PRINT:NEXT:RETUR
N
90 PLAY”T10L10O4A”
100 RETURN
```

Radio Shack Is the Place to

GET A GRIP

On Color Computer Software and Accessories



ROBOCOP

He's the future of law enforcement. Part man. Part machine. All cop. Prepare for non-stop action in this explosive game!

34.95 26-3164

PREDATOR

It's a life-or-death struggle with an alien that shows no mercy! Escape the jungle with your skin.

34.95 26-3165

PISTOL-GRIP JOYSTICK

Take control over games! Wrap your hand around this double-button controller, then hang on and get ready to intensify gripping adventures!

29.95 26-3123

RAMPAGE

Become a monster—smash a skyscraper, trash a city. Have an office building for lunch. Go on a rampage!

34.95 26-3174

ARKANOID

Light-speed space action thrusts you into a do-or-die battle. Use mighty weapons to fight "Doh", the grid monster.

34.95 26-3043

Radio Shack®

The Technology Store℠

A DIVISION OF TANDY CORPORATION

CoCo Gallery

SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also please include a few facts about yourself.

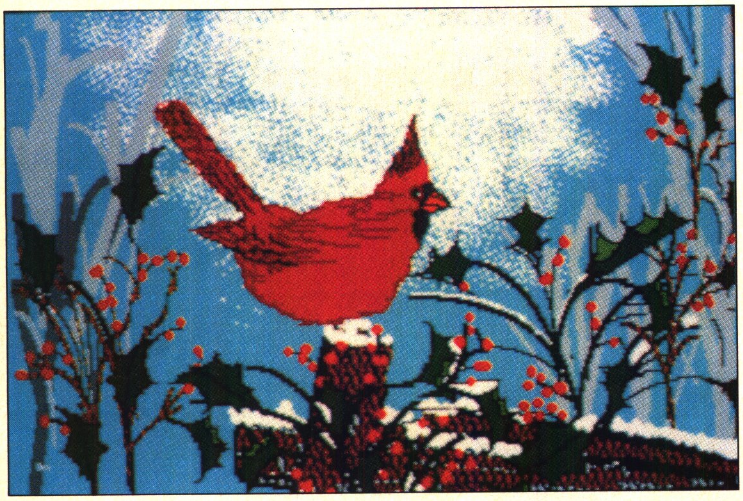
Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is not an original work.

We will award one first prize of $25, one second prize of $15 and one third prize of $10.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

—Tony Olive, Curator

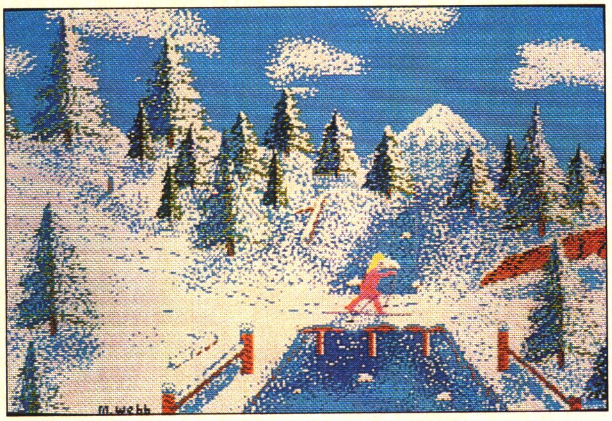
1st Place



Cardinal
Howard Rouse

Howard, who is retired, finds the time to create wonderful graphics combining the best features of *CoCo Max III* and *Color Max 3*. He lives in Belleville, Florida.

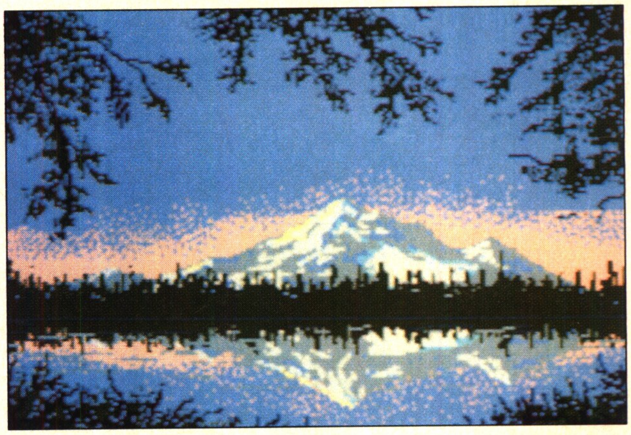
3rd Place



Snowscene
Mark Webb

This image was created with *CoCo Max III*. Mark lives in Gold River, British Columbia and works as a pulp mill operator. He has had various CoCos for several years. His favorite pastime is programming animation demos.

2nd Place



Snowpeak
James J. Gibbons

As a professional artist and art teacher, James uses a variety of graphics programs including *The Rat*, *Micro-Illustrator*, *Sketch*, *The Color Computer Artist*, *CoCo Max II* and *CoCo Max III*, which was used for this scene. He plans to continue working in this field until his pictures look like paintings. James lives in Watsontown, Pennsylvania.

Barden's Buffer

Take Your Files for a Spin

by William Barden, Jr.
Contributing Editor

Mrs. Barden just went through dozens of agonizing hours learning *WordPerfect 5.0*. In the process I acquired a new vocabulary subset equal to that of a Chief Petty Officer. Some of you have struggled through OS-9. In spite of protestations from the OS-9 gang about how incredibly easy it is to learn, it usually takes dozens of "incredibly easy" hours. Every time I add a new piece of software or hardware to either my MS-DOS system or my CoCos, I spend anywhere from one or two days to the rest of my natural life trying to get the darned things to work. Isn't there any software or hardware that's intuitive? This question inspired me to write a new program.

I had in mind a *R*L*D*X* program — you know, those revolving files of small cards that allow you to easily locate a name, telephone number and address. (I've referred to it without the full complement of letters because manufacturers get sticky about trademarks.)

My idea was to emulate a *R*L*D*X* on the CoCo 3 by showing cards on the right half of the screen. By pressing the up arrow, you could flip through the cards in one direction. By pressing the down arrow, you could flip though the cards in the other direction. At the end of the cards you'd come around again to the start in the circular list. To keep things simple, you'd be allowed to pull out one card from the stack and put it on the left-hand side of the screen. You could then edit the card and replace it anywhere you'd like; an example would be to change an address or to re-sequence the card. There are no fancy sorts here — if the card was out of sequence, you'd have to flip through the cards and insert it in the proper place. Such a file of cards could be used for telephone reference or Christmas card lists.

Anyway, that was the idea. I thought the whole project would be easy to program. As it turned out, I was wrong. I should have known that Old Programmer's Axiom Number 565 was in force — there are no easy programs. Let me tell you how my final program works.

Running *R*L*D*X*

To run *R*L*D*X*, enter the program and type `RUN`. There is a single card on the right-hand side of the screen. The card displays:

```
STARTING CARD
FIELD 1
FIELD 2
```

This is just a sample card and can be deleted or modified.

The bottom line on the left-hand side of the screen shows the current mode: Command, Edit, Read or Write.

To add a new card, press N. A new card is displayed on the left-hand side of the screen, which is used for editing only or for inserting new cards. You can enter text on ten lines of a card with up to 38 characters per line. Use the up and down arrow keys to move the cursor around the ten lines and change them as desired. To get out of Edit mode, press CLEAR; the edited card remains on the left-hand side of the screen. You have to insert the card at the proper place in the file.

To insert the card, select the proper place by using the up and down arrow keys to move through the file. Initially, with only one card displayed, you won't be able to sequence through the file, but as cards are added you can get to any card in the file by using the arrow keys. To speed up access you can also use the right and left arrow keys to move ahead or back 10 cards at a time. An insert is done by pressing I. The card on the left-hand side of the screen (initially a new card) is inserted *before* the card displayed on the screen. After you insert the card, it disappears from the left side of the screen and reappears on the right-hand side in the file.

As more cards are added, you see up to six cards displayed on the screen at one time. The first card is always shown as a full card with its ten fields displayed in their entirety. The remaining five cards show 38 characters of a single line in packed format, which I will describe later.

To re-sequence a card, first display it as the first card on the right-hand side of the screen. Then press P to pull the card. The card is pulled from the file and appears on the left-hand side of the screen. You can move through the file by using the arrow

---

Bill Barden has written 35 books and hundreds of magazine articles about small computers . His newest Color Computer book is "Connecting the CoCo to the Real World", a book of CoCo interfacing projects. He has over 20 years experience in the industry on systems ranging from mainframes to micros.

keys. To reinsert the card, follow the Insert instructions above.

To delete a card, display it as the first card on the right-hand side of the screen and press D. The card is deleted and the next card in sequence becomes the front card.

To change a card's fields, pull the card by locating it and pressing P. Edit it by pressing E. Change the text on the screen and then press CLEAR to get out of Edit mode. Reinsert the card as above.

Implementing such a program in CoCo BASIC is not simply a matter of "slinging down code". There are important design considerations to be made that affect the speed and capacity of the final result.

To save a card file, press W for Write. The current cards are saved as the file `ROLDATA.DAT`. To read in a saved file, press R three times. The `ROLDATA.DAT` file is read in and destroys any cards you have in memory. If you've mistakenly pressed R, you'll see `READ?` and then `READ??` in the Mode display on the bottom left of the screen. Press ENTER to prevent a catastrophic read and return to the Command Input mode. For a recap of the keys see Table 1.

Some Design Considerations

Implementing such a program in CoCo BASIC is not simply a matter of "slinging down code". There are important design considerations to be made that affect the speed and capacity of the final result.

Memory Storage

First of all, consider the amount of storage in such a program. Let's say a *R*L*D*X* has 300 cards, a typical number of entries. Any text data could be on any card. For typical use, though, you'd probably have a name, address and phone number. An average entry is as follows:

Barden, Bill
Post Office Box 3568
Mission Viejo, CA 92692
(714) 555-1212

This entry requires 73 characters. Other entries will be shorter or larger, but for planning purposes, assume that 70 characters is a good average.

With 300 cards, the total capacity required is 70 * 300 or 21,000 characters. Each character requires a byte of memory. In addition, there's storage required for the BASIC *R*L*D*X* program. Let's say the program is about 300 lines long with an average of 25 characters per line. Even though the program will be tokenized, the program requires about 6000 bytes by itself. The amount of free memory with no program loaded in CoCo 3 BASIC with a disk drive is 22,824 bytes.

Right away there's a problem. How can 300 cards worth of data be stored in memory with the program and require 27,000 bytes when there's only 22,824 bytes to work with? Obviously, we'll have to set our sights a little lower. However, there are some things you might want to do to modify this program for a larger number of cards.

One solution is to put the cards on disk. However, with the cards on disk, the speed of the program will probably be downgraded considerably as cards are brought in from the disk file. You'd probably have to use assembly language to get acceptable scrolling speeds with a disk file.

Another solution is to take advantage of the 128K or 512K bytes in the CoCo 3. The CoCo 3 uses a 64K block of memory for BASIC. Another 64K is used for CoCo 3 high-resolution functions: the Hi-Res screen, `HBUFF` storage for `HGET`s and `HPUT`s, and so forth. Unfortunately, there's no memory left over for variables in a 128K system. However, in a 512K byte CoCo 3 system, there's another 384K bytes of memory just waiting to be used for storage. This block can be accessed by the special `LPEEK`s and `LPOKE`s in CoCo 3 Super Extended BASIC. However, to do this you need some kind of special memory allocation scheme that lets you store strings of varying size in an efficient manner. This is not an easy task.

For this version, we have to get by with about 15,000 bytes for storage — about 230 average cards or 500 cards with an average of 32 characters (enough for a name and phone number).

Program Speed

Another consideration for *R*L*D*X* is speed of operation. The manner in which data is stored very much affects the speed of access. We could use an array of strings. Array `Z$` might have 300 entries, `Z$(0)` through `Z$(299)`, that can be easily read or changed. However, there's a problem. An array such as this is fine if the data is fixed and never changes. In *R*L*D*X*, though, cards need to be reshuffled. Cards are pulled out and changed, or new cards are added. Each time this is done, an array has to be reshuffled.

Suppose a card is to be inserted between two existing cards at `Z$(100)` and `Z$(101)`. All array elements after `Z$(100)` would have to be moved down to make room for the new card that replaces `Z$(101)`. The same thing would happen on card deletes. All cards after the deleted card would have to be moved up to fill the vacated spot. This movement of data takes an enormous amount of time and slows down the operation of the program considerably. Isn't there a more efficient way?

One way around this problem of moving data is to use a linked list. The following list is an example. Start with a list of names such as Jim, Bob, Mary, Grace, Tom, Son, and Carlos. Assign a number to each name as follows:

0	Jim
1	Bob
2	Mary
3	Grace
4	Tom
5	Son
6	Carlos

Now add a new entity called a *pointer* to each name that represents the next name in alphabetized order. First add a Head of List pointer that points to the first name in the alphabetized list:

Head of List: 1

0	Jim
1	Bob
2	Mary
3	Grace
4	Tom
5	Son
6	Carlos

This head of list pointer points to Bob, the first name in the alphabetized list. Now add a pointer to each name that points to the next name in the list:

Head of List: 1

0	Jim	2
1	Bob	6
2	Mary	5
3	Grace	0
4	Tom	-1
5	Son	4
6	Carlos	3

Now we can scan the list by starting with

CoCo Stuff

DynaStar

THE Most Popular OS-9 Word Processor!

"It is an excellent word processor for business and home use, whether for clerical or programming work." RAINBOW Review April 1989, Page 34. Also see July 1984, Page 220.

DynaStar word processor/formatter~~150.00~~

SPECIAL ONLY 99.95

DynaSpell

by Dale Puckett

20,000 & 102,000 word dictionaries included.
DynaSpell spelling checker 35.00

SPECIAL WHEN PURCHASED WITH DynaStar 20.00

The Wiz

"The Wiz: Unquestionably one of the finest OS-9 terminal programs available.", "The Wiz has it all."

List $79.95

Now on **SALE** for **ONLY $59.95!**

(Includes ***WizPro*** shareware disk)

Hard Drive Stuff

*"Frank Hogg Laboratories has been selling hard-drive systems **longer** than any other RAINBOW advertiser"*

Burke and Burke

B&B XT PC style interface	69.95
B&B XT RTC w/clock	99.95
B&B Real Time Clock (add to kit price)	30.00
B&B XT ROM Auto Boot from hard disk	19.95
B&B Hyper I/O DECB on hard drive	29.95
B&B Hyper III Ramdisk/spooler	19.95

B&B Kits:

20 Meg Kit 40 MS Complete	495.00
30 Meg Kit 40 MS Complete	530.00
40 Meg Kit 28 MS Complete	675.00
Assemble fmt & test any of the above	50.00

The Eliminator™

The Eliminator™ interface has **2 serial ports, 1 parallel port and Real Time Clock socket. PLUS a Hard Disk Interface**

The Eliminator™	**NEW PRICE**	159.95
WD1002-05 Hard/Floppy Controller		199.35

Eliminator OPTIONS:

Real Time Clock chip	30.00
Serial cable set (2 DB25)	30.00
Parallel cable (Centronics)	30.00
Floppy Cable Int & Ext	25.00

Eliminator Kits:

20 Meg High Speed Kit 40 MS	779.00
40 Meg High Speed Kit 28 MS	939.00
70 Meg High Speed Kit 28 MS	1299.00
Assemble fmt & Test any of the above	60.00

Hard Drive Bits and Pieces

Dual Hard Drive case w/60W P/S & Fan	89.95
FBU Fast HD BackUp **NOW ONLY**	35.00
R.S.B. RS Disk Basic under OS9	39.95

Floppy Drives (5.25" and 3.5 FLOPPY DISKS)
TEAC High Quality Drives - 1 Year Warr.

FD55B 360K 40 Track DS 5.25"	99.00
FD55F 720K 80 Track DS 5.25:	151.00
FD35F 720K 80 Track DS 3.5"	99.00

(Bare drives, requires case and power supply)

PC Keyboard Adaptor

Use your standard PC keyboard or buy ours, either way you get a 'real' keyboard for your CoCo.

Bob Puppo's PC Keyboard adaptor	99.00
Kit version with all parts	80.00
Bare board, Docs & EPROM (no parts)	60.00
PC 101 Key Keyboard with keyclick	70.00

68030 QT K-System 16Mhz

ANNOUNCING: 16Mhz 68030, 2 Megabytes RAM, 4 serial ports , 1 parallel port , Full SCSI interface with 105Meg catching SCSI hard disk at 17MS access,720K Floppy, Battery backed Clock/RAM/Timer, OS9/68K, FBU AND QCOM. 6 slots for expansion.

Complete with case, power supply and software. **4695.00.**
60 Meg Tape Backup add **595.**

16Mhz 68000 version of the above with 40 Meg drive **3595.00**

These are example prices, all systems are custom made to your specs. Call for a quote for your particular needs.

The ***QT K-System*** is based in the 12 Slot K-BUS. This bus has the same power connections as used by PC's and is small enough to fit most clone PC cases. You can assemble a system yourself a piece at a time and add to and upgrade as you see fit. Basic systems with OSK can be assembled for under 1500. Send or call for a brochure and more information. Ask for information on the ***QT 20x*** and ***QT 00x*** also.

QT K-System Boards

K-BUS	12 SLOT BUS (For the following cards)	$189.95
K-CPU-030	68030 CPU 16MHZ	889.95
K-CPU-68K/10	10 MHZ 68000 CPU BOARD	189.95
K-CPU-68K/12	12 MHZ 68000 CPU BOARD	219.95
K-CPU-68K/16	16 MHZ 68000 CPU BOARD	269.95
K-ACIA 2	2 Port Async Serial (68681 - DB25 connectors)	149.95
K-ACIA 4	4 Port Async Serial (68681 - RJ-45 Connectors)	249.95
K-TCMP	Timer, Battery RTC/RAM,Parallel Printer Port	149.95
K-PAR	4 Port Parallel Interface (6821)	149.95
K-FDC	Floppy Disk Controller (1772) 4 drives	149.95
K-SCSI	SCSI Controller (5380)	149.95
K-DRAM-2M	2 MegaByte Dynamic Memory 80NS Chips	749.95
K-DRAM-0	2 MegaByte Dynamic Memory (no memory chips)	299.95
K-MEM-256K	256K Static RAM (fully populated)	529.95
K-MEM-0K	256K Static RAM or 27256 Type EPROM	89.95
K-DMA	2 Channel DMA (68440)	189.95
K-MATH-0	MATH CoProcessor less chip	89.95
K-MATH-81	MATH CoProcessor with 68881 installed	299.95
K-PROTO	General Purpose Wirewrap	59.95
K-BUSMON	Bus Monitor with LED's and Single Step Switch	189.95
K-PCA PC BUS	PC Bus adaptor includes 8 slot PC Bus and cable	299.95

OS9/68K SOFTWARE PRODUCTS

OS9/68000 Includes Editor, Assembler, Debugger, Scred	$300.00
BOOT-ROM SET Required for OS9/68K	50.00
PC-DOS UTILITY Utility to Read/Write/Format PC-DOS under OS9	99.95
DynaStar for OS9/68K	150.00
SMART from Informix	1400.00
FBU Fast HD Backup (same as CoCo version)	50.00
Send for complete list	

ORDERING INFORMATION

VISA and M/C, check and C.O.D. Contential U.S. software shipping add $3.50 Ground - $6.00 Two Day Air. Hardware add $11 ground - $22 Two Day Air. Please call for Next Day Air costs and C.O.D. Foreign add 10% Shipping (Minimum $5 USD). NY residents please add 7% sales tax. Thank You

Frank Hogg Laboratory, Inc.

Since 1976
204 Windemere Road
Syracuse, NY 13205
315/469-7364 24Hours

the Head of List pointer and then finding the number of each consecutive entry in this order: 1 - 6 - 3 - 0 - 2 - 5 - 4 to get Bob, Carlos, Grace, Jim, Mary, Son and Tom. The last entry, Tom, has no next entry and has a special -1 pointer to mark this fact.

Suppose we want to insert the new name Megan in the list. Since the list is unordered, we can just add it to the end:

Head of List: 1

0	Jim	2
1	Bob	6
2	Mary	5
3	Grace	0
4	Tom	-1
5	Son	4
6	Carlos	3
7	Megan	

To reorder the list, the only thing that needs to be changed is the pointers. Search until the insertion point is found.

Head of List: 1

0	Jim	2
1	Bob	6
2	Mary	5
(insert after Mary)		
3	Grace	0
4	Tom	-1
5	Son	4
(insert before Son)		
6	Carlos	3
7	Megan	

Next change the pointer associated with Mary (5) to 7, the location of Megan. Then move the 5 to the pointer associated with Megan.

Head of List: 1

0	Jim	2
1	Bob	6
2	Mary	7
3	Grace	0
4	Tom	-1
5	Son	4
6	Carlos	3
7	Megan	5

The strings for the names remain in place. The only thing needed to reorder the list is to scan the list to find the insertion point, then change one pointer and add a new pointer. The reason this scheme works so well on computers is that a list of pointers can be scanned and changed very quickly — a great deal faster than moving entire character strings around.

Deleting an entry works in a similar fashion. Suppose we wanted to delete Carlos. First, we scan the list to find Carlos and the name just before Carlos.

Head of List: 1

0	Jim	2
1	Bob	6
(points to Carlos)		
2	Mary	7
3	Grace	0
4	Tom	-1
5	Son	4
6	Carlos	3
7	Megan	5

Now we can delete Carlos by changing the 6 pointer associated with Bob to the 3 value found in the Carlos entry and putting a special flag with Carlos to indicate that it has been deleted:

Head of List: 1

0	Jim	2
1	Bob	3
(points to Grace)		
2	Mary	7
3	Grace	0
4	Tom	-1
5	Son	4
6	Carlos	-2
(deleted)		
7	Megan	5

This is the scheme we use with *R*L*D*X*, but I've added a new kink. Since we want to go both forward and backwards in *R*L*D*X* we have two sets of pointers, one that goes forward through the list, and one that goes *back* through the list. That way we can easily go back without having to start from the beginning of the list to find the previous card.

Implementing R*L*D*X

Now that the memory and speed aspects are out of the way, *R*L*D*X* can be implemented. Of course, it still might be slow or hog memory, but at least we've given the program some thought and there's a better chance of success. Listing 1 shows the final version. This version packs `BASIC` statements into each line to speed up execution, but this makes it harder to decipher.

Card Storage

Each card has up to 10 fields of data on it, with each field on a separate line. A field can contain from 0 to 38 characters. You might use Field 0 for a last name, Field 1 for a first name, Field 2 for a street address, and so forth. You can put any text you want in the fields. *You* determine the order of the cards in the file.

Cards are stored in *packed* format in memory and in the `ROLDATA.DAT` disk file. (There is only one disk file of data, but you can easily expand *R*L*D*X* to include a file of any name.) Packed format concatentates the 10 fields together in one long string with a ! character used as a separator. A typical packed entry is `Barden!Bill!Post Office Box 3568!Mission Viejo!CA!92692`. The packed format is unpacked for screen display and editing.

Packed strings are stored in the `Z$` array, an array of 500 entries numbered 0 through 499. String arrays are an efficient way to store data, as the strings can be variable sizes and there is no lost space at the ends of fields. There is a little overhead to hold data about the string name, size and so forth, but this is a small price to pay for the convenience of strings.

Field Storage

When cards are displayed on the screen for editing, the data on the cards is held in

- Down arrow — Move forward one card at a time.
- Up arrow — Move back one card at a time.
- Left arrow — Move forward ten cards at a time.
- Right arrow — Move back ten cards at a time.
- P — Pull front card for re-sequencing or editing.
- I — Insert pulled or new card before front card.
- E — Edit a pulled or new card.
- N — Display a new card and enter Edit mode.
- D — Delete front card.
- R (three times) — Read the `ROLDATA.DAT` file.
- W — Write the current file to `ROLDATA.DAT`.

Edit mode —
  Up arrow — Move up one line.
  Down arrow — Move down one line.
  Right arrow — Move right one character position.
  Left arrow — Move left one character position.
  Text keys — Enter text.
  CLEAR — End Edit mode.

Table 1: Key Commands for *R*L*D*X*

an array called `T$`. This is a string array of 10 entries, `T$(0)` through `T$(9)`, representing the ten possible fields. Another similar array, `F$`, holds field data for the card displayed on the right-hand side of the screen.

Pointers

Pointers to the entries in `Z$` are kept in an integer array called `P`. Like `Z$`, it has 500 entries. Both forward and backwards pointers are maintained to save storage space. These are designated as the *before* and *after* pointers, respectively. If before pointers are kept in one array and after pointers in a second array, the total storage is 500*5*2 or 5000 bytes, since CoCo BASIC uses five bytes per numeric variable. By packing two pointers in one array entry, however, 2500 bytes of storage are saved. Both the before and after pointers must be able to hold values from 0 to 499. The two pointers are packed by multiplying the after pointer by 1024 and adding the before pointer. The result can be held in a single numeric entry. (The result is *value**1024 + 499 with a maximum of 511475.) The pointers are unpacked by obtaining the result of `INT(value/1024)` (after pointer value) and `value-INT(value/1024)*1024` (before pointer value).

Pointer values of 1023 represent a *no following* or *no preceding* pointer just as -1 represents those conditions in the linked list examples.

Current Entry

Variable `PI` is the pointer to the current entry, the card displayed in front on the screen. The Get Current Entry subroutine uses `PI` to find the value for the after pointer (`PA`) and the before pointer (`PB`). The subroutine also returns the current packed string entry in `Z$` by using `PI`.

Deletions and Insertions

Deletions and insertions work much the same as the linked list examples shown previously. The current entry pointed to by `PI` is deleted by nulling out the string (`Z$(PI)=""`). Both the after and before pointers replace the corresponding pointers in the previous and following pointers in Array `P`. The `P` entry for the deleted item is set to -2 (never used or deleted). An insert searches the `P` array to find the first entry with a -2 indicating that it is available. When found, its location is used as the pointer values for the two pointers that bracket the insert point. The other pointers in the bracketing entries are also changed.

Edit on Screen

Editing can take place for both a new card and for a pulled card. The Edit mode reads the keyboard one character at a time. An arrow key causes the edit cursor to move up or down one line or one character position left or right. A text character is inserted on both the screen and in the `T$` edit array at the same time. Pressing CLEAR ends the edit; the edited text is in `T$(0)` through `T$(9)`. A subsequent insert stores the edited text in an inserted record.

Reads and Writes

Both the read and write functions use the same sequential file, `ROLDATA.DAT`. The Write first stores the head of list variable `HD` and then stores the 500 entries for the `P` and `Z$` arrays. The Read operation reads the data in the same order, essentially initializing a new file in memory. The `ROLDATA.DAT` file can be displayed or changed in many CoCo text editors.

Summary

*R*L*D*X* shows how you can emulate some real-world operations. Access time for any record is short, and the program provides quick and easy editing of any card from the screen. Feel free to bend and hammer to shape if you are so inclined. ❑

New

XPort The Extended Port Interface for the CoCo 1,2, or 3. **Only $74.95**

Three buffered cartridge slots, 12 volts power, use RS232-hard/floppy controller & more! No need to replace your existing hardware! No need for new software. Slot switching to avoid ROM Conflicts, Introductory priced.

Orion TECHNOLOGIES

Telepak II. **Truly compatible RS232 pak. 19,200 baud - uses standard Coco RS232 addressing. Complete with cable. $49.95**

Double sided 1/2 Height Drives

	360 K	720 K
TEAC	$89.95	$99.95
Name Brand	$79.95	$89.95

Drive cables:5ft
Single-$10.00
double-$12.50
Triple-$15.00

2400 baud modem & cable
3 / 12 /2400 baud. Auto answer/ auto dial. AT command set. 2 year warranty. 6 ft. cable . (specify 4-pin or DB25) only $129.95

From Alpha Software Technologies

Disk manager tree	29.95	OS9 L II BBS	29.95
Multi-menu	19.95	Warp One	34.95
Level II tools	24.95	Presto Partner	29.95

UPDOS Coco III DOS
HSAVE/HLOAD Graphics save. Easy to use M/L config. Auto boot Even OS9!! Only **$24.95**

Turbo 512K RAM $89.95
Premium 120 NS Ram chips! Complete with inst. Ram test,Ram disk &spooler.
0k board w/software................. $38.95

4 pin - DB25......$12.95
DB25m-m/m-f... $ 9.95
Magnavox RGB..$14.95
Y-cables 2 slot...$27.95

Vterm ..39.95-SuperComm..$29.95

Call 316-946-0440

Orion Technologies P.O. Box 63196 Wichita, KS 67203
All orders include $3.00 shpg/hdlg COD Additional $3.00.
All prices US.funds. Actual shipping costs outside U.S.

32K Disk

230	84
330	37
450	173
550	132
620	9
690	132
770	137
870	233
1000	179
1100	107
1200	200
1300	127
1370	1
1450	213
1550	245
1650	244
1750	48
1840	212
1950	31
2020	149
2110	15
2230	134
2350	151
2430	248
2490	212
2620	213
END	61

The Listing: R*L*D*X

```
100 ' R*L*D*X PROGRAM
110 ' COPYRIGHT 1990 WILLIAM BAR
DEN, JR.
120 ' DATA DICTIONARY
130 ' A$=WORKING STRING
140 ' B$=WORKING STRING
150 ' C=COLUMN FOR EDIT MODE
160 ' F$()=FIELD ARRAY
170 ' HD=HEAD OF LIST
180 ' I=WORKING INDEX
190 ' J=WORKING INDEX
200 ' K=WORKING INDEX
210 ' MD$=MODE NAME
220 ' NU=NUMBER OF ENTRIES
230 ' P()=POINTER ARRAY LINKS AH
EAD AND BEHIND
240 ' PA=ENTRY AFTER CURRENT
250 ' PB=ENTRY BEFORE CURRENT
260 ' PI=CURRENT ENTRY (ONE DISP
LAYED COMPLETELY)
270 ' PT=TEMPORARY POINTER
280 ' R=ROW FOR EDIT MODE
290 ' RC=REMOVE CARD, 1 IF CARD
REMOVED
300 ' T$=FIELD ARRAY FOR EDIT MO
DE
310 ' T1=TEMPORARY VARIABLE
320 ' T2=TEMPORARY VARIABLE
330 ' T3=TEMPORARY VARIABLE
340 ' TL=TAIL OF LIST
350 ' Z$()=STRING ARRAY FOR CARD
S
360 CLEAR 10000
370 HBUFF 1,6500
380 HBUFF 2,680
390 DIM Z$(499)
400 DIM P(499)
410 HSCREEN 4
420 HCLS
430 HGET (321,88)-(639,167),1
440 HGET (321,72)-(639,79),2
450 NU=0
460 PI=1023: PA=1023: PB=1023
470 RC=-1
480 MD$="COMMAND"
490 FOR I=1 TO 499:P(I)=-2:NEXT
500 P(0)=1023*1024+1023: Z$(0)="
STARTING CARD!FIELD 1!FIELD 2!":
HD=0: NU=1: TL=0
510 PI=HD: GOSUB 1060: GOSUB 125
0: GOSUB 1390
520 MD$="COMMAND": GOSUB 2710
530 C$=INKEY$: IF C$="" THEN GOT
O 530
540 IF C$<>"R" THEN GOTO 610
550 MD$="READ?": GOSUB 2710
560 C$=INKEY$: IF C$="" THEN GOT
O 560 ELSE IF C$<>"R" THEN GOTO
610
570 MD$="READ??": GOSUB 2710
580 C$=INKEY$: IF C$="" THEN GOT
O 580 ELSE IF C$<>"R" THEN GOTO
610
590 MD$="READ": GOSUB 2710
600 GOSUB 2300: GOTO 520
610 IF C$="W" THEN MD$="WRITE":
GOSUB 2710: GOSUB 2230: GOTO 520
620 IF C$<>CHR$(10) THEN GOTO 65
0
630 GOSUB 1060: IF PA=1023 THEN
PI=HD ELSE PI=PA
640 GOSUB 1060: GOSUB 1390: GOTO
 520
650 IF C$<>CHR$(94) THEN GOTO 68
0
660 GOSUB 1060: IF PB=1023 THEN
PI=TL ELSE PI=PB
670 GOSUB 1060: GOSUB 1390: GOTO
 520
680 IF C$="P" THEN GOSUB 1670: G
OTO 520
690 IF C$="D" THEN GOSUB 1830: G
OTO 520
700 IF C$="I" THEN GOSUB 1900: G
OTO 520
710 IF C$="N" THEN GOSUB 2120: G
OTO 520
720 IF C$="E" THEN GOSUB 2380: G
OTO 520
730 IF C$<>CHR$(8) THEN GOTO 760
740 FOR I=1 TO 10: GOSUB 1060: I
F PA=1023 THEN PI=HD ELSE PI=PA
750 GOSUB 1060: NEXT: GOSUB 1390
: GOTO 520
760 IF C$<>CHR$(9) THEN GOTO 790
770 FOR I=1 TO 10: GOSUB 1060: I
F PB=1023 THEN PI=TL ELSE PI=PB
780 GOSUB 1060: NEXT: GOSUB 1390
: GOTO 520
790 GOTO 520
800 '
810 ' INSERT ENTRY
820 FOR I=0 TO 499: IF P(I)=-2 T
HEN GOTO 840 ELSE NEXT
830 PI=1023: GOTO 930
840 P(I)=PA*1024+PB
850 IF PB=1023 THEN GOTO 870
860 T1=P(PB)-INT(P(PB)/1024)*102
4: P(PB)=I*1024+T1
870 IF PA=1023 THEN GOTO 900
880 T1=INT(P(PA)/1024): P(PA)=T1
*1024+I
890 P(PA)=T1*1024+I
900 Z$(I)=A$: NU=NU+1
910 IF HD=1023 THEN HD=I
920 PI=I: GOSUB 1060
930 RETURN
940 '
950 ' DELETE ENTRY
960 PA=INT(P(PI)/1024): PB=P(PI)
-PA*1024: P(PI)=-2: NU=NU-1
970 IF NU=0 THEN HD=1023
980 Z$(PI)=""
990 IF PB=1023 THEN GOTO 1010
1000 T3=P(PB)-INT(P(PB)/1024)*10
24: P(PB)=PA*1024+T3
1010 IF PA=1023 THEN GOTO 1030
1020 T3=INT(P(PA)/1024): P(PA)=T
3*1024+PB
1030 RETURN
1040 '
1050 ' GET CURRENT ENTRY
1060 IF PI=1023 THEN PA=1023: PB
=1023: A$="": GOTO 1080
1070 A$=Z$(PI): PA=INT(P(PI)/102
4): PB=P(PI)-PA*1024
1080 RETURN
1090 '
1100 ' PACK STRING
1110 A$=""
1120 FOR J=0 TO 9: A$=A$+F$(J)+"
!": NEXT
1130 RETURN
1140 '
1150 ' UNPACK STRING
1160 B$=A$
1170 FOR J=0 TO 9: F$(J)="": NEX
T
1180 FOR J=0 TO 9: K=INSTR(B$,"!
```

Unlock The Real Power of Your CoCo

BASIC USERS GET FULL CAPACITY AND POWER WITH THESE FAST MACHINE LANGUAGE PROGRAMS THAT RUN IN THE BACKGROUND!

"BIG BASIC"

COCO 3'S MISSING LINK

Basic Users get full control of managing all CoCo memory

"Danosoft has a winner in *Big Basic*, and I would recommend it to anyone wanting to get the most out of a Color Computer 3." - Rainbow, Oct./89.

- Now you can access up to 472K of memory in a 512K CoCo or up to 92K in a 128K machine with any mix of programs and/or data . At last, you can do sizable basic programming with a CoCo 3.
- BIG BASIC creates programming windows where you can put up to 58 separate running programs, or up to 58 parts of one large program or database. Concept permits big programs to run fast.
- Chain in unlimited sized programs, or program parts, or data ,from disk(s) without erasing existing programming or variables. Also works with the RGB-DOS Hard Disk system and ADOS3.
- 3 new simple basic words create the power.
- Variable exchange between program windows provided.
- Modifies your basic operating system in some 70 locations but does not occupy user memory.
- Includes 7 Demo Programs and Manual. Any disk version RS-DOS.
- ONLY $39.95 U.S. or $46.50 CDN. + S & H

"UTILITIES PACKAGE"

ACCESS BOTH SIDES OF YOUR DRIVES

"Must - have software for the disk user"
- Rainbow, Nov. /89.

"BIG DISK"	• Makes computer see double-sided drives as one 360K (80tk) drive; 158 granules.
"DOUBLE40"	• Sets drives for 40 tracks each side.
"CONVERT/DISK"	• Formats 40 tracks on each side of a disk without disturbing the first 35. Doubles all your present storage.
"QUIKDRIV/6MS"	• Sets fast drive stepping rate.
"QUIKDRIV/30M	• Fast drive shut off.
"SET FEED"	• Sets line spacing for printouts.

For any CoCo (at least 64K) with 1.1 or 2.1 Disk Extended Basic

Only $17.95 U.S. or $20.85 CDN. + S & H.

"MEMORY MASTER"

OUR FAVORITE PROGRAMMING TOOL

"*Memory Master* is a unique hacker's program offering about all you could ask for in a disk and memory utility." - Rainbow, Sept./89.

- Scan, Edit, Copy, Printout any memory in your computer or on disk. Fix disks. Restore killed files.
- Fast entry of M.L. Listings.
- Dual Windows! Runs 2 Basic Programs at once!
- Disk chains unlimited amounts of program sections or data.
- Includes Demo Program and Manual.
- Any CoCo (at least 64K) with 1.1 or 2.1 Disk Extended Basic
- Only $24.95 U.S. or $28.95 CDN. + S & H.

"BIG RAMDISK" (512k CoCo3 V.2.0 or V.2.1)

- Copy or backup your programs or data to "BIG RAMDISK and get the speed of program/data saving or loading to an "in memory" device. ("COPYDISK" Utility included.)
- Great for use with all other programs on this page and most commercial software. (Except "Simply Better")
- You can install, re-install, format and reformat from direct mode or from a program without erasing programming or variables. It's in machine language, does not occupy user memory, but can be user located elsewhere if needed.
- Your choice of one big 158 granule ramdisk (80 tracks-360k) or two 68 or 78 granule ramdisks (35-40 tracks to 360k total), depending on your DOS. (i.e. RS-DOS, "BIG DISK", "DOUBLE40", etc.) Max 4 physical drives and 2 ramdisks.
- Ramdisk files and directory do not erase with a reset coldstart (ALT/CTRL), and are preserved if a program crashes. This lets you use some programs that need a Coldstart to exit.

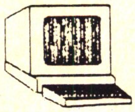
ONLY $12.95 US or $14.95 CDN + S & H.

RAINBOW
CERTIFICATION
SEAL

NOW FROM DANOSOFT! DALE RICKERT'S

Feature Packed

"Simply Better"



*RUN 2 INTERACTIVE WORD PROCESSORS AT ONCE * MAIL-MERGE * CREATE INDEXES / TABLE OF CONTENTS * PRINT-FILL FORMS DISPLAYS FONTS IN COLORS * DISPLAYS UNDERLINING * PRINT SPOOLING * AUTO SAVES * PRINT/SAVE BLOCKS OF TEXT * TO 480K OF TEXT STORAGE * SORTS TEXT * NUMBERING * CALCULATOR * TASKS * HEADERS * FOOTERS * PAGES * FINDS * PREVIEW "WYSIWYG", ETC. MUCH MORE.

CoCo3's Best, Easy to use

Word Processor

With some Database Features

Will hold a customer list of more than 5000 in memory for quick recall or editing.

"..... An excellent choice at an unbelievable price." - Rainbow, April ,1989

"Significantly Better? Mais Oui! " - Rainbow, Feb., 1990

Includes extensive, well indexed manual.
128k or 512k CoCo3 V.2.0 or V.2.1
ONLY $39.95 U.S. or $46.50 CDN. + S & H

Need more info? See the Rainbow Reviews of these Programs.

To any single shipment of one or more products add $2.50 S&H. Ontario Residents add 8% P.S.T.

DANOSOFT
Box 124, Station "A"
Mississauga, Ontario L5A 2Z7

10% Discount
on purchase of
3 or more items
at the same time.

Order by Phone or Mail
(416) 897-0121
Shipped Airmail Same Day

VISA
MasterCard

```
")
1190 IF K=0 THEN F$(J)=B$: GOTO
1220
1200 F$(J)=LEFT$(B$,K-1): B$=RIG
HT$(B$,LEN(B$)-K)
1210 NEXT
1220 RETURN
1230 '
1240 ' DISPLAY CARDS ON SCREEN
1250 IF NU=0 THEN GOTO 1360
1260 HCLS
1270 GOSUB 2710
1280 HLINE (0,0)-(639,191),PSET,
B
1290 HLINE (321,80)-(638,191),PS
ET,B
1300 HCIRCLE (420,184),6: HCIRCL
E (540,184),6
1310 IF NU>1 THEN HLINE (320,64)
-(638,191),PSET,B
1320 IF NU>2 THEN HLINE (320,48)
-(638,191),PSET,B
1330 IF NU>3 THEN HLINE (320,32)
-(638,191),PSET,B
1340 IF NU>4 THEN HLINE (320,16)
-(638,191),PSET,B
1350 IF NU>5 THEN HLINE (320,0)-
(638,191),PSET,B
1360 RETURN
1370 '
1380 ' DISPLAY CARD TEXT
1390 T1=PI
1400 HPUT (328,88)-(631,167),1,P
SET
1410 HPUT (328,72)-(631,79),2,PS
ET
1420 HPUT (328,56)-(631,63),2,PS
ET
1430 HPUT (328,40)-(631,47),2,PS
ET
1440 HPUT (328,24)-(631,31),2,PS
ET
1450 HPUT (328,8)-(631,15),2,PSE
T
1460 GOSUB 1060
1470 GOSUB 1160
1480 FOR J=0 TO 9: HPRINT (41,11
+J), F$(J): NEXT
1490 IF NU<2 THEN GOTO 1640
1500 IF PA=1023 THEN PI=HD: GOSU
B 1060 ELSE PI=PA: GOSUB 1060
1510 HPRINT (41,9), LEFT$(A$,38)
1520 IF NU<3 THEN GOTO 1640
1530 IF PA=1023 THEN PI=HD: GOSU
B 1060 ELSE PI=PA: GOSUB 1060
1540 HPRINT (41,7), LEFT$(A$,38)
1550 IF NU<4 THEN GOTO 1640
1560 IF PA=1023 THEN PI=HD: GOSU
B 1060 ELSE PI=PA: GOSUB 1060
1570 HPRINT (41,5), LEFT$(A$, 38
)
1580 IF NU<5 THEN GOTO 1640
1590 IF PA=1023 THEN PI=HD: GOSU
B 1060 ELSE PI=PA: GOSUB 1060
1600 HPRINT (41,3), LEFT$(A$,38)
1610 IF NU<6 THEN GOTO 1640
1620 IF PA=1023 THEN PI=HD: GOSU
B 1060 ELSE PI=PA: GOSUB 1060
1630 HPRINT (41,1), LEFT$(A$,38)
1640 PI=T1: RETURN
1650 '
1660 ' PULL CARD
1670 IF RC=1 THEN GOTO 1800
1680 IF PI=1023 THEN GOTO 1800
1690 GOSUB 1060: PT=PA: T$=A$: GOSUB 960: PI=PT: GOSUB 1060
1700 IF NU<6 THEN GOSUB 1250
1710 GOSUB 1390: A$=T$: GOSUB 11
60
1720 FOR J=0 TO 9: T$(J)=LEFT$(F
$(J)+STRING$(38," "),38): NEXT
1730 HLINE (1,40)-(319,40),PSET
1740 HLINE (1,152)-(319,152),PSE
T
1750 HLINE (319,40)-(319,152),PS
ET
1760 HPUT (8,48)-(311,117),1,PSE
T
1770 HCIRCLE (100,144),6: HCIRCL
E (220,144),6
1780 FOR J=0 TO 9: HPRINT (1,6+J
),T$(J): NEXT
1790 RC=1
1800 RETURN
1810 '
1820 ' DELETE CARD
1830 IF PI=1023 THEN GOTO 1870
1840 GOSUB 1060: PT=PA: GOSUB 96
0: PI=PT: GOSUB 1060
1850 IF NU<6 THEN GOSUB 1250
1860 GOSUB 1390
1870 RETURN
1880 '
1890 ' INSERT CARD
1900 IF RC<>1 THEN GOTO 2080
1910 GOSUB 1060
1920 FOR I=0 TO 9
1930 IF T$(I)=STRING$(38," ") TH
EN F$(I)="": GOTO 1990
1940 FB=-1
1950 FOR J=LEN(T$(I)) TO 1 STEP
-1
1960 IF MID$(T$(I),J,1)<>" " AND
 FB=-1 THEN FB=J
1970 NEXT
1980 F$(I)=LEFT$(T$(I),FB)
1990 NEXT
2000 GOSUB 1110: PA=PI: GOSUB 82
0: GOSUB 1060: IF PB=1023 THEN H
D=PI
2010 GOSUB 1060: GOSUB 1250: GOS
UB 1390
2020 HLINE (1,40)-(319,40),PRESE
T
2030 HLINE (1,152)-(319,152),PRE
SET
2040 HLINE (319,40)-(319,152),PR
ESET
2050 HCIRCLE (100,144),6,0: HCIR
CLE (220,144),6,0
2060 HPUT (8,48)-(311,117),1,PSE
T
2070 RC=-1
2080 RETURN
2090 '
2100 RETURN
2110 ' NEW CARD
2120 IF RC=1 THEN GOTO 2150
2130 FOR I=0 TO 9: T$(I)=STRING$
(38," "): NEXT: GOSUB 1730
2140 GOSUB 2380: RC=1
2150 RETURN
2160 '
2170 ' EDIT MODE
2180 IF RC<>1 THEN GOTO 2200
2190 GOSUB 2380
2200 RETURN
2210 '
2220 ' WRITE FILE
2230 OPEN "O", #1, "ROLDATA"
2240 WRITE#1, HD, NU, TL
2250 FOR I=0 TO 499: WRITE#1,P(I
),Z$(I): NEXT
2260 CLOSE
2270 RETURN
2280 '
2290 ' READ FILE
2300 OPEN "I", #1, "ROLDATA"
2310 INPUT#1,HD, NU, TL
2320 FOR I=0 TO 499: INPUT#1,P(I
),Z$(I): NEXT
2330 PI=HD: GOSUB 1060
2340 GOSUB 1250: GOSUB 1390: CLO
SE
2350 RETURN
2360 '
2370 ' EDIT ON SCREEN
2380 IF RC<>1 THEN GOTO 2510
2390 R=6: C=1: MD$="EDIT": GOSUB
 2710
2400 GOSUB 2540: GOSUB 2630
2410 IF C$=CHR$(10) THEN IF R=15
 THEN GOTO 2400 ELSE GOSUB 2580:
R=R+1: GOTO 2400
2420 IF C$=CHR$(94) THEN IF R=6
THEN GOTO 2400 ELSE GOSUB 2580:R
=R-1: GOTO 2400
2430 IF C$=CHR$(9) THEN IF C=38
THEN GOTO 2400 ELSE GOSUB
2580:C=C+1: GOTO 2400
2440 IF C$=CHR$(8) THEN IF C=1 T
HEN GOTO 2400 ELSE GOSUB 2580:C=
C-1: GOTO 2400
2450 IF C$=CHR$(13) THEN GOSUB 2
580: IF R=15 THEN C=1: GOTO 2400
 ELSE R=R+1: C=1: GOTO 2400
2460 IF C$<CHR$(32) THEN IF C$=C
HR$(12) THEN GOTO 2510
2470 GOSUB 2670: HPRINT (C,R), C
$: MID$(T$(R-6),C,1)=C$
2480 C=C+1: IF C=39 THEN C=1: R=
R+1
2490 IF R=16 THEN R=15
2500 GOTO 2400
2510 RETURN
2520 '
2530 ' CURSOR DISPLAY
2540 HPRINT (C,R), CHR$(127)
2550 RETURN
2560 '
2570 ' CURSOR ERASE
2580 GOSUB 2670
2590 HPRINT (C,R),MID$(T$(R-6),C
,1)
2600 RETURN
2610 '
2620 ' GET CHARACTER
2630 C$=INKEY$: IF C$="" THEN GO
TO 2630
2640 RETURN
2650 '
2660 ' ERASE CP
2670 HPUT (C*8,R*8)-((C*8)+7,(R*
8)+7),1,PSET
2680 RETURN
2690 '
2700 ' TITLE
2710 HPRINT (1,22),"R*L*D*X PROG
RAM"
2720 HPUT (144,176)-(318,183),1,
PSET
2730 HPRINT (18,22), MD$
2740 HPRINT (26,22), NU
2750 HPRINT (30,22), "CARDS"
2760 RETURN
```

Color Computer Software

Window Master V3.0

Now you can have a User Friendly Point and Click operating system for your CoCo III with Windows, Icons, Buttons, Pull-Down Menus, Edit Fields and Mouse Functions built into your Basic or Machine Language Programs easily and quickly, without the need for OS9.

Now Better than ever, with built in Print Spooler and RS-232 support for the Serial port or Deluxe Pak. It supports up to 31 Windows on the display, multiple fonts in 54 possible sizes and styles, Enhanced Basic Editing and much more. It adds over 50 Commands and Functions to Basic to fully support the Point & Click Window System. In fact it has so many features it would take several pages to describe them all.

It is completely compatible with existing Basic programs and takes absolutely no memory away from Basic. It requires 1 Disk Drive, R.S. Hi-Res Interface & Joystick or Mouse. Includes both the 128k & 512k versions for only $69.95 Window Master owners call for free update!

Window-Ware

__Window Writer__ - A Point & Click Word Processor, features both Mouse & Keyboard type editing, proportional printer support, powerful formatting capability, works with any printer. On screen Italic, bold etc. WYSIWYG Requires Window Master & 512k- $59.95

__Window Writer/W__ - for non Window Master users, Requires 512K & Disk $79.95

__Window Basic Compiler__ - A Basic Compiler similar to CBASIC only it compiles all the Window Basic statements to create super fast M.L. programs & Desk Accessories. $99.00

__Window EDT/ASM__ - A full featured Editor/Assembler and Debuggeer. $49.95

__Window Comm__ - Terminal Communications with Xmodem file transfer, Split Screen and Serial I/O and Deluxe Pak support. $29.95

__Font/Icon Editors__ - A utility disk with the Font & Icon Editors so you can edit or create your own, includes Basic & M.L. versions $19.95

__Advanced Programmers Guide__ - A Guide for Basic & M.L. Programmers on interfacing to Window Masters complete system including System Calls, Memory Map, Interrupt handling & Extended Memory access. $24.95

__The Memory Game__ - A Concentration like game, lots of fun for everyone. $19.95

__Desk Assessory Pak__ - Installs 6 resident D.A. programs, including: Font & Icon Editors, Function Keys, Terminal Program, Graphics Editor, and Calendar. $39.95

512K Only $109

Give your COCO 3 all the power it deserves with this easy to install (no soldering/plug in) 100% Tandy compatible 512K memory upgrade. Completely assembled and tested. Includes Ramdisk & Memory Test software described below. $109 or **512K + Window Master $149**

512K RAMDISK & TESTER

RAMDISK will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. Plus you can __run at double speed all the time__ even for disk access!!! It's Reset protected so it won't disappear like other ramdisk programs. The tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test.

Requires 512K & Disk $19.95

CBASIC Editor/Compiler

The ULTIMATE Color Computer BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC is the answer!!!

CBASIC is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer. It will allow you to take full advantage of all the capabilities available in your CoCo without having to spend years trying to learn assembly language programming. CBASIC allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly.

CBASIC supports all the enhanced hardware available in the CoCo 2 & 3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts. We even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC is the friendliest and easiest compiler available for the Color Computer.

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. CBASIC features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

Specify Coco 1, 2 or 3 Disk $149.00

To order products by mail, send check or money order for the amount of purchase, plus $4.00 for shipping & handling to the address below.

To order by VISA, MASTERCARD or COD call us at (702) 452-0632

(Monday thru Saturday, 8am to 5pm PST).

CER-COMP Ltd.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
702-452-0632

DataPack III Plus V1.1

SUPER SMART TERMINAL PROGRAM
AUTOPILOTand AUTO-LOG Command Processors
X-MODEM DIRECT DISK FILE TRANSFER
__VT-100 & VT-52__ TERMINAL EMULATION

- No lost data even at 2400 Baud on the Serial port.
- 8 Selectable Display Formats, 32/40/64/80 columns
- ASCII & BINARY disk file transfer via XMODEM.
- Directly record receive data (Data Logging).
- VT-100 emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys ,position,, PF & Alt. Kbd. keys.
- Programmable Word Length, Parity, Stop Bits .
- Complete Full and Half Duplex operation,
- Send full 128 character set from Keyboard
- Complete Editor, Insert, Delete, Change or Add.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files from the Buffer, Macro Keys or Disk.
- Display or Print the contents of the 50k Buffer.
- Freeze Display & Review information On line.
- Built in Command Menu (Help) Display.
- Built in 2 Drive RAMDISK for 512K RAM.

Also Supports: R. S. Modem-Pak & Deluxe RS-232 Pak.

Specify Coco 1, 2 or 3 Disk - $59.95

"The SOURCE"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE will allow you to easily & quickly Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler Source code.

- Automatic label generation.
- Allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk.
- Automatically locates address.
- Output listings to the Printer, Screen or both.
- Generates Assembler source directly to disk.
- Built in Hex/Ascii dump/display.
- 8 Selectable Display formats 32/40/64/80 .
- Selectable Foreground & Background colors.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands.
- Written in Ultra Fast Machine Language.

Specify Coco 1, 2 or 3 Disk $49.95

EDT/ASM III

DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns. There is also a free standing ML Debug Monitor.

EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Local and Global string search and/or replace.
- Full Screen line editing .
- Easy to use Single key editing commands.
- Load & Save standard ASCII formatted files.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler features include:

- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file up to 9 levels deep.
- Supports standard Motorola directives.
- Allows multiple values in FCB & FDBdirectives
- Allows assembly from the Buffer, Disk or both.

Specify Coco 1, 2 or 3 Disk $59.95

A helpful program for those planning a career in business

Predicting Profits

by David Macias

One of the needs of management is to understand the relationship among fixed costs, variable costs and the potential for profit from an investment project. This is also known as *break-even point analysis*. When a business produces a product, some of its costs are fixed while others are variable. Sometimes a business must operate at a loss until a certain amount of sales is attained to cover both the fixed and variable costs. Thus the break-even point is achieved, and any additional sales go toward profits. The program presented here provides two methods for making break-even analyses.

In the `MAIN` section a title is printed briefly on the screen. Then the `MENU` procedure is called to prompt you for the method you want for calculating the break-even point. A series of prompts asks you for the raw data needed in the break-even calculations. If you make the mistake of entering a selling price lower than the unit variable cost, the program calls this to your attention and asks for all the raw data over again. When it is entered correctly, the program returns to `MAIN`. Based on the method you chose, either the procedure `METHODONE` or `METHODTWO` is called.

In the `METHODONE` procedure, calculations are made based on the maximum production capacity of a production line. You are prompted for this amount, then the program calculates and prints the break-even point in terms of percentage of units produced and in actual sales. After you press ENTER to continue, the program builds a profit analysis table. (This is a valuable tool for predicting profit.) Pressing ENTER at this point allows you to determine profit based on a sales forecast.

In the `METHODTWO` procedure you are prompted for the expected sales figure in terms of the number of units to be sold. Again the break-even point is calculated and shown on the screen. Also, the total profit (which can be a negative number) is calculated based on the expected sales. If you want to exit the program, type an uppercase N at the last prompt and press ENTER. Anything else sends you back to the first decision menu.

As for structure, I always try to use structured programming design. I managed to avoid `GOTO`s even though Microware's Pascal allows it. I prefer to use global variables when I can. In this program the compiler demands local variables for all the `FOR` loops. The use of descriptive variable names in the program makes it self-documenting, thereby minimizing the number of remark statements. Last, by using the built-in `Shell` command, I can have Pascal make use of all OS-9 windowing functions. If you plan to compile this program all the way to object code, remember to have the Pascal `Support` program in your `CMDS` directory. ❏

Ed note: This program requires OS-9 Pascal *to execute. We realize not everyone has the Pascal compiler and we would like to see a similar BASIC09 version of the program.*

David is attending Cerritos College where he studies business computer systems. He works as a computer operator in the data processing department and is a tutor for the music department in the MIDI lab. He is an advocate of the OS-9 operating system. He may be contacted at 11518 East Wimbley Court, Cerritos, CA 90701.

OS-9 Level II 512K

The Listing: `cost.pas`

```
PROGRAM COST(INPUT,OUTPUT);
(* COST - VOLUME PROFIT ANALYSIS *)
VAR REVENUES, FIXEDCOSTS, VARIABLECOSTS,
    TOTALCOST, INCOME, CAPACITY,
    BREAKEVEN, SALES, PRICE:REAL;
    N, C, X, PAUSE, SW:INTEGER;
    RESPOND, ANSWER:CHAR;

PROCEDURE METHODONE;

VAR REMOVE:INTEGER;

 BEGIN
   X:=0;
   N:=SHELL('DISPLAY 1B 22 01 14 0A 1E 02 01 00');
   WRITELN('MAXIMUM PRODUCTION CAPACITY?');
   N:=SHELL('DISPLAY 1B 22 01 34 0A 08 02 01 00');
   READLN(CAPACITY);
   BREAKEVEN:= FIXEDCOSTS / ((PRICE - VARIABLECOSTS) * CAPACITY);
   N:=SHELL('DISPLAY 1B 22 01 01 0B 28 0A 00 02');
   WRITELN;
   WRITELN('   BREAK EVEN POINT = ',(100 * BREAKEVEN):1:0,'%');
   WRITELN('   OF THE MAXIMUM PRODUCTION CAPACITY');
   WRITELN('   OR ',(BREAKEVEN * CAPACITY):1:0,' UNITS');
   WRITELN('   CORRESPONDING TO SALES REVENUES');
   WRITELN('   OF $',(BREAKEVEN * CAPACITY * PRICE):4:2);
   WRITELN;
   WRITELN('   -----<PRESS ENTER TO CONTINUE>-----');
   READLN(ANSWER);
   N:=SHELL('DISPLAY 1B 22 01 0F 00 35 18 02 03');
   WRITELN;
   WRITELN('        COST - VOLUME - PROFIT ANALYSIS TABLE');
   WRITELN;
   WRITELN;
   WRITELN('       ----------------------------------------');
   WRITELN('       UNITS     SALES   TOTAL COSTS   PROFIT');
   WRITELN('       ----------------------------------------');
   WHILE (X < CAPACITY) DO
     BEGIN
      X:= X + TRUNC(CAPACITY / 10);
      REVENUES:= X * PRICE;
      TOTALCOST:= FIXEDCOSTS + X * VARIABLECOSTS;
      INCOME:= REVENUES - TOTALCOST;
      WRITELN(X,'     $',REVENUES:8:2,'  $',TOTALCOST:8:2,'  $',
      INCOME:8:2);
     END;
   WRITELN('       ----------------------------------------');
   WRITELN;
   WRITELN;
   WRITELN('       -------<PRESS ENTER TO CONTINUE>-------');
   READLN(ANSWER);
   FOR REMOVE:= 1 TO 6 DO
     BEGIN
       N:=SHELL('DISPLAY 1B 23');
     END;
 END;

PROCEDURE METHODTWO;

VAR REMOVE:INTEGER;

 BEGIN
   N:=SHELL('DISPLAY 1B 22 01 14 0A 1E 02 01 00');
   WRITELN('EXPECTED SALES (IN UNITS)? ');
   N:=SHELL('DISPLAY 1B 22 01 34 0A 08 02 01 00');
   READLN(SALES);
   BREAKEVEN:= FIXEDCOSTS / (PRICE - VARIABLECOSTS);
   N:=SHELL('DISPLAY 1B 22 01 20 B 2D C 00 01');
   WRITELN;
   WRITELN('    BREAK-EVEN POINT =',BREAKEVEN:3:0,' UNITS');
   WRITELN('    OR $',(BREAKEVEN*PRICE):3:2);
   WRITELN;
   WRITELN;
   WRITELN(' TOTAL PROFIT = TOTAL REVENUE - TOTAL COSTS');
   WRITELN('    $',(SALES * PRICE - (FIXEDCOSTS +
   (SALES * VARIABLECOSTS))):3:2,'  =  ',(SALES*PRICE):3:2,'     -  ',
   (FIXEDCOSTS + SALES * VARIABLECOSTS):3:2);
   WRITELN;
   WRITELN(' --------<PRESS ENTER TO CONTINUE>---------');
   READLN(ANSWER);
   FOR REMOVE:=1 TO 4 DO
    BEGIN
```

SUPERSOUND

Record music, voice or sound effects for your programs or even CM3 graphics with non-stop animation & sound effects in only 128k. Even do a duet with yourself on two tracks. The best & only multi-tasking sound system & easiest of ALL to use! ALL our features work with only 128k but can use to 1meg or more memory. All sounds & variables saved on disk. Easy BASIC demos help get you started. Supersound does what the others cannot!

CoCo3, 128k, 1 disk **$39.95**

SUPERSHOW

Lets you create a slide show with sound & animation. Mix MGE & CM3 graphics.

CoCo3, 128k, 1 disk **$7.95**

SAY'N'SPELL

Let your CoCo3 help your children learn. Their spelling words in YOUR own voice, recorded & saved on disk. Easy to use & makes homework fun. Parent enters the words once & your CoCo will drill them all week, watch grades go up! Useable by children in 1st grade & up. Includes cable to record from cassette. Deduct $5 if you have SUPERSOUND cable.

CoCo3, 128k, 1 disk. **$19.95**

ULTRAED

The BEST CoCo3 assembler/disassembler available. Two work buffers, online help file & true source code disassembly makes this utility a must for the serious programmer. Supports 80 col. screen & full disk I/O. Requires EDTASM+ cart to make a working copy. By Randel Reid.

CoCo3, monitor, 128k, 1 disk **$22.50**

COLOR GRAPHICS

All of our graphics print drivers offer: True RGB to CMY color conversion for a real What-You-See-Is-What-You-Get print, even ALL 4096 colors of RASCAN pictures. Offer ON-SCREEN color preview/editing. Rich colors with double the ribbon life. Prints for use in a 5x7 and/or 8x10 picture frame. Mirror prints that can be used for left/right pairs or make T-shirt transfers with proper L/R perspective. Partial screen printing for letterheads. Drop in a black ribbon for perfect B & W prints of full color graphics pictures!

RAS*MAX

Now print 4096 RASCAN color pictures in Photo sharp FULL COLOR on a Star NX1000 rainbow or compatible full color printer. Also supports 16 color and B & W. RASCAN is not needed to print pictures.

CoCo3, 128k, 1 disk, printer **$19.95**

STAR*MAX

Print CM3, MGE or HSCREEN2 pictures on STAR NX1000 rainbow/compatible printer. Double-screen pictures for 8x10 frames. Even prints snapshot size in full color!

CoCo3, 128k, 1 disk, printer	**$19.95**
STAR NX1000 4 color ribbon	**$ 9.95**
Heat Transfer 4 color ribbon	**$12.95**

CGP*MAX

Print CM3, MGE, or HSCREEN2 pictures on CGP-220 or compatible, full color only!

CoCo3, 128k, 1 disk, printer **$14.95**

SUPERSOFT, INC

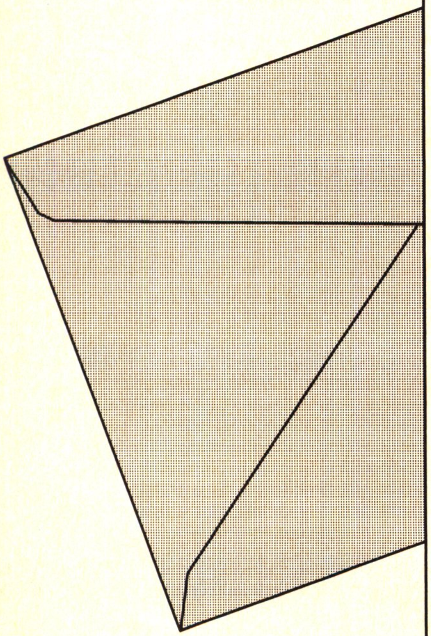
363 Oakwood Ave., Jackson, MI 49203
(517) 787-3610 $2.50 S/H per order
Visa/M.C. Check, M.O., MI res add 4% sales tax

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Send your correspondence to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059.



```
      N:=SHELL('DISPLAY 1B 23');
    END;
 END;

PROCEDURE MENU;

VAR WAIT:INTEGER;

 BEGIN
   N:=SHELL('DISPLAY 1B 22 01 0F 04 35 0D 01 01');
   N:=SHELL('DISPLAY 1B 22 01 0E 03 35 0D 02 03');
   WRITELN;
   WRITELN;
   WRITELN('             BREAK - EVEN POINT ANALYSIS');
   WRITELN('  ---------------------------------------------------');
   WRITELN;
   WRITELN;
   WRITELN;
   WRITELN('          BASED ON PRODUCTION CAPACITY   (1)');
   WRITELN;
   WRITELN('          BASED ON SALES FORECASTS       (2)');
   WRITELN;
   WRITELN('             ENTER 1 OR 2 AND HIT <ENTER>');
   N:=SHELL('DISPLAY 1B 22 01 37 0E 02 01 00 01');
   READLN(C);
   N:=SHELL('DISPLAY 1B 23');
   N:=SHELL('DISPLAY 1B 23');
   N:=SHELL('DISPLAY 1B 23');
   IF (C > 2) THEN C:= 2;
   IF (C < 1) THEN C:= 1;
   WRITELN;
   WRITELN;
   REPEAT
     IF (SW = 0) THEN
      BEGIN
       N:=SHELL('DISPLAY 0C');
       WRITELN;
       WRITELN;
       WRITELN('          TOTAL FIXED COST   ?');
       WRITELN;
       WRITELN('          UNIT VARIABLE COST ?');
       WRITELN;
       WRITELN('          UNIT SELLING PRICE ?');
       SW:= 1;
      END;
     N:=SHELL('DISPLAY 1B 22 01 28 02 08 06 01 00');
     READLN(FIXEDCOSTS);
     WRITELN;
     READLN(VARIABLECOSTS);
     WRITELN;
     READLN(PRICE);
     IF (VARIABLECOSTS >= PRICE) THEN
      BEGIN
       N:=SHELL('DISPLAY 1B 22 01 01 01 2A 06 01 01');
       N:=SHELL('DISPLAY 1B 22 01 02 02 28 04 00 03');
       N:=SHELL('DISPLAY 1F 24');
       WRITELN('       THE SELLING PRICE MUST BE');
       WRITELN('      GREATER THAN THE UNIT PRICE!');
       FOR WAIT:=1 TO 15000 DO
        BEGIN
          (* PAUSE LOOP*)
        END;
       N:=SHELL('DISPLAY 1F 25');
       N:=SHELL('DISPLAY 1B 23');
       N:=SHELL('DISPLAY 1B 23');
       N:=SHELL('DISPLAY 1B 23');
      END;
   UNTIL (PRICE > VARIABLECOSTS);
 END;

BEGIN  (* MAIN *)

   SW:=0;
   RESPOND:='Y';
   N:=SHELL('DISPLAY 1B 32 01 1B 33 00');
   N:=SHELL('DISPLAY 05 20');
   N:=SHELL('DISPLAY 0C');
   N:=SHELL('DISPLAY 1B 22 01 0F 04 35 09 01 01');
   N:=SHELL('DISPLAY 1B 22 01 0E 03 35 09 02 03');
   WRITELN;
   WRITELN;
   WRITELN('         THIS IS THE COST-VOLUME ANALYSIS PROGRAM');
   WRITELN('                PROGRAMMED by David Macias');
   WRITELN('                          12-26-89');
   FOR PAUSE:=1 TO 18000 DO
    BEGIN
     (* LOOP DELAY *)
   END;
   N:=SHELL('DISPLAY 1B 23');
   N:=SHELL('DISPLAY 1B 23');
   N:=SHELL('DISPLAY 05 21');
   REPEAT
      MENU;
      IF C= 1 THEN
         METHODONE
      ELSE
         METHODTWO;
      N:=SHELL('DISPLAY 05 20');
      N:=SHELL('DISPLAY 1B 22 01 0A 02 20 07 00 01');
      WRITELN;
      WRITELN(' DO YOU WISH TO DO AN ANALYSIS?');
      WRITELN;
      WRITELN(' ENTER N TO END OR PRESS ENTER');
      WRITELN('        TO CONTINUE');
      READLN(RESPOND);
      N:=SHELL('DISPLAY 1B 23');
      N:=SHELL('DISPLAY 05 21');
   UNTIL RESPOND= 'N';
   N:=SHELL('DISPLAY 0C');
END.
```

New For OS-9 Level II

Screen Dumps for Type 5
Graphics Screens
And a Screen Print Utility
For Types 1 and 2 Text
Screens

Command
Line
Fast! Invocation

For DMP-105/130 and
Compatibles
This ad was written using
this screen dump package

Use Built-In Power of OS-9
To Make Your Own Logos,
Letterheads, and Borders
Mix Text and Graphics
Using Basic09 Programs

Three Screen Dumps for the
Introductory Price of $17.95
(USA Funds) Plus S&H $ 2.00

Introductory Offer Good
Until May 1, 1990

Send Money Order or Check
(Checks should allow time
to clear)

G.T.T.D. Software
P.O. Box 187
Pablo, MT 59855
Phone:1-406-883-2306 (Eves.)

Lyra "...a professional-quality, graphics-oriented, eight voice MIDI composition system for creating playable music MIDI data ... if you have a CoCo with at least 64K and a MIDI synthesizer, you *must* have Lyra."--Walter Myers, *Rainbow* review, November 1989. Comes with LyraPrint and a CoCo to MIDI cable. Everything you need to get started! Only $59.95

Lyra Lybrary is a collection of music for Lyra. "From Mozart and Beethoven to Irving Berlin and Henri Mancini to Phil Collins and Michael Jackson, there is a great deal of music here to explore and enjoy."--Walter Myers, *Rainbow* review, December 1988. 18 disks (over 375 titles) for $125 or $14.95 per disk, *or* $20.00 per disk, your choice of titles. Send SASE for list of titles.

The Lyra Companion is a 100 page book filled with everything you wanted to know about Lyra. "...nicely presented and contains a wealth of useful information for the Lyra user at any level of experience."--Walter Myers, *Rainbow* review, November 1989. Just $9.95

CoCo MIDI 3 "...the only real-time interactive MIDI sequencer for the Color Computer ... CM3 has more powerful features than you can shake a synthesizer at."--Jeffrey S. Parker, *Rainbow,* December 1989. Works with any CoCo with 64K memory. Ask about our new enhanced CoCo 3 version! Requires MPI or Y-cable. $150.00 complete (program and required MIDI interface pak).

Hot CoCo is a 50 minute professionally recorded audio tape of original compositions by CoCo artists. Four different performers bring you funky jazz, rock 'n roll, and classical styles. You'll love it! $9.95

Ask about our synthesizer editor/librarians!

Rulaford Research
P.O. Box 530328
San Diego, CA 92153
(619) 690-3648

Exclusive distributor for Australia and New Zealand:

Australian Peripheral Developments
P.O. Box 134, Springwood
Queensland, 4127 Australia
(07) 341 9061

Novices Niche

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Home Help

Keeping a Tab on Your Tap

by Roger E. Severs

16K Extended

This program can be used to figure personal water bills or can be used as the core of a billing system for a small water company. It was written on a CoCo but also runs on an MS-DOS computer under GW-BASIC.

Most small water companies start their computations with a fixed rate. In this example I set the Base (`B`) at 3000 gallons and the dollar amount for the base (`D`) at $16.50. Then `R` is the rate per gallon above the base, which in this example is .175 cents per gallon, or $1.75 per thousand gallons. Also, I set `LC` to .1 for a 10 percent late charge. If your water company doesn't use a fixed base rate, set `B` and `D` to zero, and `R` and `LC` to the rates your company uses.

The Listing: `WATER`

```
0 ‘ COPYRIGHT 1990  FALSOFT,INC
10 ‘WATRBIL BY ROGER SEVERS 9/89
20 B=3000’BASE AMOUNT OF CONSUMP
TION
30 D=16.5’DOLLAR AMOUNT FOR BASE
40 R=.00175’RATE PER GALLON
50 LC=.1’LATE CHARGE RATE
60 CLS
70 INPUT” PREVIOUS READING”;P
80 INPUT” PRESENT READING”;PR
90 C=PR-P:PRINT” CONSUMPTION”;C
100 CT=C+CT:IF C<B GOTO 120
110 IF C>=B GOTO 130
120 FC=0:GOTO 140
130 C=C-B:FC=C*R
140 T=D+FC:PRINT” NET CHARGE IS
“;T
150 PRINT” TOTAL CONSUMPTION IS
“;CT
160 INPUT” IS THERE A LATE CHARG
E Y/N”;L$
170 IF L$=”Y” THEN 180 ELSE 60
180 INPUT” ENTER LAST MONTH’S WA
TER BILL “;LT
190 FC=LT*LC:PRINT” 10% LATE CHA
RGE IS “;FC
200 INPUT” WAS LAST MONTH’S WATE
R BILL PAID Y/N”;M$
210 IF M$=”N” THEN 250 ELSE 220
220 PRINT” TOTAL CHARGE IS “;T+F
C
230 INPUT” TO START A NEW BILL E
NTER A”;G$
240 IF G$=”A” THEN GOTO 60 ELSE
END
250 INPUT” ENTER UNPAID BILL”;U
260 NT=T+FC+U
270 PRINT” TOTAL CHARGE IS”;NT
280 INPUT” TO START A NEW BILL E
NTER A”;G$
290 IF G$=”A” THEN 60 ELSE END
```

Graphics

And Along Came a Spider

by Joseph Pendell

CoCo 3

Spiders is a small graphics program that requires a CoCo 3. It draws five spiders with different faces, which move down the screen hanging by their webs. The spider that makes it to the bottom of the screen first is put in the center of the screen and turns many colors. To use the program, just type in and run the listing.

The variable `Q` in Line 10 is the speed at which the spiders move down the screen. It can have a value between two and nine. The numbers in Line 30 are the colors of the CoCo's palette I chose for the spiders. The loop from Line 70 to Line 180 draws the five spiders and stores them in buffers to be put onto the screen later. Lines 200 through 230 make the spiders move down the screen. The movement for the spider is to have it move down `Q` positions, Line 210, then have it move back up one position, Line 220. This gives a bouncing effect.

The Listing: `SPIDERS`

```
0 ‘ COPYRIGHT 1990  FALSOFT,INC
1 ‘SPIDERS
2 ‘BY JOSEPH PENDELL
10 Q=5:’SPEED OF SPIDERS
20 FORI=1TO5:HBUFF I,700:NEXTI
30 DATA 0,47,25,61
40 DATA”BM122,99;R2;BR2;R2;BR2;R
2;BR2;R2”,”BM122,99;NU1;M+6,+1;R
2;M+6,-1;U1”,”BM124,100;U1;R8;D1
;L8”,”BM122,100;M+6,-1;R2;M+6,+1
```

```
",""BM124,99;R8"
50 FORI=0TO3:READC:PALETTE I,C:N
EXTI
60 HSCREEN4
70 FORI=1TO5:D(I)=RND(3):HDRAW"C
"+STR$(D(I))
80 HCIRCLE(128,96),15:'BODY
90 HDRAW"BM140,91;M+15,-5;M+15,+
2;BM142,94;M+12,-3;M+15,+3;BM142
,97;M+12,-2;M+15,+4;BM140,100;M+
15,-1;M+15,+5":'RIGHT LEGS
100 HDRAW"BM116,91;M-15,-5;M-15,
+2;BM114,94;M-12,-3;M-15,+3;BM11
4,97;M-12,-2;M-15,+4;BM116,100;M
-15,-1;M-15,+5":'LEFT LEGS
110 HDRAW"BM124,94;NU1;NR1;NL1;N
D1":'LEFT EYE
120 HDRAW"BM131,94;NU1;NR1;NL1;N
D1":'RIGHT EYE
130 HDRAW"BM128,96;D1":'NOSE
140 HDRAW"BM128,89;U13":'WEB
150 READ M$:HDRAW M$:'MOUTH
160 HGET(85,76)-(172,105),I
170 HCLS
180 NEXTI
190 FORI=1TO5:A(I)=0:HPUT((I-1)*
130,0)-((I-1)*130+88,29),I,PSET:
NEXTI
200 I=RND(5):A(I)=A(I)+Q:IFA(I)>
162 THEN 240
210 HPUT((I-1)*130,A(I)+1)-((I-1
)*130+88,A(I)+30),I,PSET
220 HPUT((I-1)*130,A(I))-((I-1)*
130+88,A(I)+29),I,PSET
230 GOTO200
240 HCLS:HDRAW"C"+STR$(D(I))+"BM
320,90;U90":HPUT(276,85)-(364,11
4),I,PSET:FORK=1TO10:J=RND(63):F
ORL=1TO4:PALETTE L,J:PLAY"L255T2
55CDEFGAB":NEXTL,K:PALETTE CMP:E
ND
```

Home Help

What Is on the Agenda for Today?

32K
Extended

by Kerian Kenny

A scratch pad for the things you have to remember can come in quite handy. *Agenda* helps you remember dates such as birthdays and appointments with the dentist. When you run the program, you see a menu with a pointer ">" positioned at the top choice (`LOAD`). Use the up/down arrow keys to position the pointer next to the option of your choice and press `ENTER`.

To enter your first reminder, choose `ADD`. Enter the date to be remembered in whatever form you like (e.g., 2/3/90) and then enter the reminder. Enough space has been dimensioned and string space cleared for about 366 items of 60 characters in length (including the date). Items can be shorter or longer. The maximum length of an item is 249 characters less the length of the date entered. The screen position above the up-arrow is the limit.

Long items will necessarily reduce the number of items you can enter, but some items will probably be very short and there will probably be enough days for which no entry is required. Consistent use of abbreviations is recommended. You can use the same data for more than one entry.

Reminders can be entered as they come, and date order is not required. You can neatly format your entry on the screen, but that will require entering more spaces and using more memory. As I said, it's a scratchpad.

After each entry you are returned to the menu. Choose `ADD` for further entries until all your reminders have been entered. Then choose `SAVE` and give your file a name (e.g., `1990`).

If a disk drive is plugged in, your file will be saved to or loaded from disk. Otherwise it will be saved or loaded to or from tape. The value `DV=1` or `DV=-1` is established in Line 30.

Next time you have a reminder to enter, load `1990`, choose `ADD` on the menu, and enter your reminder as above. Then save the whole file again as `1990`.

If you want to find an entry, load `1990` and select `SEARCH`. You can enter any string or part of a string you know to be in an entry. So if you want to check on your appointments with Dr. Pillpopper, type `PILLPOPPER`, and all files in which that name appears will be displayed on the screen in their order of entry. Most frequently you will want to enter the day's date (2/3).

The Search routine is quite fast because the complete file is in memory. The high-speed poke is in effect except when you are actually saving or loading a file. Line 40 establishes the poke values `SP=65497` and `SL=65496` if you are using a CoCo 3, or `SP=65495` and `SL=65494` if you are using a CoCo 1 or CoCo 2. If your CoCo will not take the high-speed poke, delete or omit Line 40 and the pokes in lines 160, 240, 470 and 550.

You might find the menu choice routines starting in Line 60 useful for your own programs. Type your choices as in lines 170 through 210. The value of `UP` is one less than the print position of the first option on the screen and the value of `DN` is one less than the position of the last option. If your first item is at print position 66, you can have up to thirteen choices on the screen — (`UP=65` and `DN=449`).

The Listing: AGENDA

```
0 'AGENDA' by Keiran Kenny,
   Sydney, 1989.
1 ' COPYRIGHT 1990  FALSOFT,INC
10 GOTO560
20 DIMDY$(366)
30 IFPEEK(&H15F)=196THENDV=1ELSE
DV=-1
40 IFPEEK(&HFFFE)*256+PEEK(&HFFF
F)=&H8C1B THENSP=65497:SL=65496E
LSESP=65495:SL=65494
50 GOTO160
60 Q=UP:PK=1
70 PRINT@Q,CHR$(62);
80 K$=INKEY$:IFK$=""THEN80
90 IFQ<UP THENQ=UP
100 IFK$=CHR$(10)ANDQ=DN THEN140
110 IFK$=CHR$(10)THENPRINT@Q,CHR
$(143);:Q=Q+32:PK=PK+1:PRINT@Q,C
HR$(62);
120 IFK$=CHR$(94)ANDQ>65THENPRIN
T@Q,CHR$(143);:Q=Q-32:PK=PK-1:PR
INT@Q,CHR$(62);
130 IFK$=CHR$(13)GOTO150
140 GOTO80
150 RETURN
160 POKESP,0:CLS:PRINT"USE UP/DN
 ARRROW:ENTER TO SELECT"
170 UP=65:PRINTTAB(2)"LOAD AGEND
```

B&B SOFTWARE
1637 Hanchett NW
Grand Rapids MI 49504

DISK ONLY

☐ KILLEHAWK: Space strategy game. Play by modem, null cable or solo >>$8.00<<

☐ JOY: Learn how to make your own low cost ATARI® joystick converter >>$6.00<<

☐ Hard copy available for >>$6.50<<

RAINBOW CERTIFICATION SEAL

☐ ARCADE FACTORY: You draw the characters and make the rules >>$8.00<<

Any two for >>>$13.00<<<
(616) 453-1011 AFTER 5:00 PM

Name:________________
Address:________________
City/ST:________________
Zip:________________
Check or Money order

```
A"
180 PRINTTAB(2)"ADD ENTRIES"
190 PRINTTAB(2)"SEARCH"
200 PRINTTAB(2)"SAVE AGENDA"
210 PRINTTAB(2)"END PROGRAM"
220 DN=193:GOSUB60
230 PRINTPK:ONPK GOTO240,330,410
,470,550
240 POKESL,0:CLS:INPUT"LOAD AGEN
DA NAME:";F$:IFDV=-1THENPRINT"PO
SITION TAPE. PRESS PLAY. PRESSAN
Y KEY.":EXEC44539:GOTO260
250 F$=F$+"/DAT"
260 OPEN"I",#DV,F$
270 INPUT#DV,RN
280 FORT=1TORN
290 LINEINPUT#DV,DY$(T)
300 NEXT
310 CLOSE#DV
320 GOTO160
330 CLS:LINEINPUT"ENTER REMINDER
 DATE: ";DT$
340 CLS:PRINT"ENTER REMINDER FOR
 "+DT$
350 PRINT@249-LEN(DT$)+35,"^"
360 PRINT@32,"";
370 RN=RN+1
380 LINEINPUTRN$
390 DY$(RN)=DT$+": "+RN$
400 GOTO160
410 CLS:LINEINPUT"SEARCH FOR: ";
S$
420 CLS:FORT=1TORN:IFINSTR(1,DY$
(T),S$)THENPRINTDY$(T)
430 FORP=1386TO1417:IFPEEK(P)<>9
6THENPRINTTAB(8)"PRESS ANY KEY."
;:EXEC44539:CLS:GOTO440ELSENEXTP
440 NEXTT
450 E$="**END OF FILE "+CHR$(34)
+S$+CHR$(34)+"**":PRINTTAB(16-LE
N(E$)/2)E$
460 PRINTTAB(2)"**FOR MENU, PRES
S ANY KEY**";:EXEC44539:GOTO160
470 POKESL,0:CLS:INPUT"SAVE AGEN
DA NAME";F$:IFDV=-1THENPRINT"PRE
SS PLAY AND RECORD. PRESS ANYKEY
.":EXEC44539
480 OPEN"O",#DV,F$
490 PRINT#DV,RN
500 FORT=1TORN
510 PRINT#DV,DY$(T)
520 NEXT
530 CLOSE#DV
540 GOTO160
550 POKESL,0:CLS:END
560 PMODE0:PCLEAR1:CLEAR24000:GO
TO20
```

Games

Cutting Corners

by John T. Wells

CoCo 3

Here is a familiar game consisting of a rectangle with a moving line inside it, which is controlled by the arrow keys. The object of the game is to keep the line moving as long as possible without the line intersecting or hitting the wall of a rectangle. The game is over when two lines intersect or you touch a wall. Your score is printed when the game is over.

The Listing: CHASE

```
0 ' COPYRIGHT 1990  FALSOFT,INC
1 POKE65497,0
2 HSCREEN2:HCLS8
3 HLINE(60,20)-(260,171),PSET,B
4 HLINE(62,22)-(257,168),PSET,B
5 HPAINT(61,21),1,1
6 X=160:Y=95:XX=160:YY=95:FL=1:I
N=9:CT=0
7 IN$=INKEY$:IF IN$<>"" THEN IN=
ASC(IN$)
8 XX=X:YY=Y:IF IN=94 THEN Y=Y-1
ELSEIF IN=10 THEN Y=Y+1 ELSEIF I
N=9 THEN X=X+1 ELSEIF IN=8 THEN
X=X-1
9 IF FL=0 THEN IF HPOINT(X,Y)=1
THEN 14
10 FL=0
11 HSET(X,Y,6):HSET(XX,YY,1)
12 CT=CT+1
13 GOTO7
14 HCOLOR2,8:HPRINT(9,10),"THAT'
S IT"
15 HPRINT(9,15),"SCORE IS ":HPRI
NT(20,15),CT
16 HPRINT(9,20),"PRESS <ENTER> T
O END":LINE INPUT IN$
17 HCOLOR1,8
18 POKE65496,0
19 END
```

Steady Aim Fire

by Kathy Rumpel

CoCo 3

Bird Hunt is a challenging shoot-'em-up game for the CoCo 3. A bird sits on a telephone wire and you control the BB gun at the bottom on the screen with the left and right arrow keys. To shoot at the bird, just press the up arrow key and a BB will be fired. If you hit the bird in the heart, it chirps and you receive 100 points and a new victim appears. If you miss, the bird flies away and another one arrives. Don't take too long to aim because time will run out and the game will be over. Happy hunting!

The Listing: BIRD

```
0 ' COPYRIGHT 1990  FALSOFT,INC
1 'BIRDHUNT
2 'KATHY RUMPEL
3 'ROUTE 1 BOX 67-A
4 'ARCADIA,  WI  54612
5 RGB:ON BRK GOTO 39
6 POKE 65497,0:SC=0:TIMER=0
7 HSCREEN2:HCLS8:HCOLOR4,8
8 HLINE(10,55)-(305,55),PSET
9 A$="S12R5F2D3GF3E3DRDRDL5G2L7H
2U2EHU3E2BF2BD2FGHEBD2RFD2GL2HU2
ERBH2LBR5R"
10 B$="S4R2BRR2BRBDL7DR7DL7BDBRR
5BDBLL3BDBRR"
11 C$="U25E2R2F2D25L6"
12 IF TIMER>1900 THEN GOSUB39
13 HO=150:VE=200
14 HDRAW"BM=HO;,=VE;C6"+C$
15 H=RND(250):V=20
16 IF H>250 THEN H=250 ELSE IF H
<50 THEN H=50
17 HDRAW"BM=H;,=V;C2"+A$
18 H=H+4:V=V+22
19 HDRAW"BM=H;,=V;C3"+B$
20 I$=INKEY$:IF I$="" THEN 20
21 HDRAW"BM=HO;,=VE;C8"+C$
22 IF I$=CHR$(8) THEN HO=HO-10
23 IF I$=CHR$(9) THEN HO=HO+10
24 IF I$=CHR$(94) THEN GOSUB 31
25 IF HO>300 THEN HO=300
26 IF HO<10 THEN HO=10
27 HDRAW"BM=HO;,=VE;C6"+C$
28 GOTO 20
29 HCOLOR4,8:HLINE(10,55)-(305,5
5),PSET:HDRAW"BM=H;,=V;C8"+B$
30 GOTO 12
31 FOR SH=VE-10 TO 35 STEP-35:HS
ET(HO+5,SH,4)
32 HLINE(10,55)-(305,55),PRESET
33 H=H-4:V=V-22
34 HDRAW"BM=H;,=V;C8"+A$
35 H=H+4:V=V+22
36 IF HPOINT(HO+5,SH)=8 THEN GOS
UB 38 ELSE HSET(HO+5,SH,8):NEXT
37 GOTO 29:GOTO12
38 HCLS8:PLAY"T25504DCAE":SC=SC+
100:HCOLOR4,8:HPRINT(12,1),"SCOR
E:":HPRINT(20,1),SC:HCOLOR4,8:RE
TURN
39 FORX=1TO5:PLAY"T25504DCAE":NE
XTX:HCOLOR3,8:HPRINT(9,15),"ANOT
HER ROUND? (Y/N)"
40 I$=INKEY$:IF I$="" THEN 40
41 IF I$="Y" THEN RUN ELSE POKE6
5496,0:CLS:END
```

Title Screen Splashdown

by Paul L. Olmstead

16K
Extended

Want to add a little animation to the title screen of your BASIC program? Just type in and run `FALLING`. This short routine can be appended to any BASIC program and used as a title screen that clears a little bit differently than BASIC's `CLS` command.

There are four lines you may use for text or graphics characters on a 32-column text screen.

After you've typed in the short listing, save it to disk or tape. Then, type `RUN` and press ENTER. The title will appear. Press ENTER again and watch the title and its border fall apart into the water. Have fun and don't get wet.

The Listing: `FALLING`

```
0 ' COPYRIGHT 1990  FALSOFT,INC
10 '******************************
12 '** FALLING LETTERS          **
14 '** BY PAUL OLMSTEAD         **
16 '** AN ALTERNATIVE TO "CLS"**
18 '** (C) 1990 FALSOFT, INC. **
20 '******************************
22 POKE &HFFD9,0
24 DIM T(128)
26 GOSUB 64
28 CO=0
30 Y=RND(128):X=T(Y)
32 IF X<>0 THEN CO=CO+1:GOTO 38
34 IF CO<>128 THEN 30
36 POKE &HFFD8,0:END
38 X=PEEK(1151+Y):T(Y)=0
40 N=Y+1151:POKE N,223
42 FOR M=1 TO 11
44 P=PEEK(N+32)
46 POKE N+32,X
48 IF N+32>1471 AND N+32<1503 TH
EN POKE N+31,175:POKE N+33,175:X
1=1:X=223
50 IF X1=1 THEN FOR D=1 TO 4:NEX
T D
52 IF X1=1 THEN X1=0:POKE N+31,2
23:POKE N+33,223
54 IF N+32>1535 THEN 62
56 IF N+32>1503 THEN POKE N+32,1
75:POKE N,175:FOR D=1 TO 8:NEXT
D:POKE N,223
58 POKE N+32,P:N=N+32
60 NEXT M
62 GOTO 34
64 CLS6
66 PRINT @128,STRING$(33,201);
68 PRINT @161," FALLING LETTERS
TITLE SCREEN ";
70 PRINT @191,CHR$(201);CHR$(201
)
72 PRINT @197,"(C) 1990, FALSOFT
 INC.";
74 PRINT @223,STRING$(33,201);
76 FOR L=1504 TO 1535:POKE L,175
:NEXT L
78 PRINT @329,"RESS ANY KEY.";
80 EXEC &HADFB
82 FOR L=1353 TO 1366:POKE L,223
:NEXT L
84 FOR L=1 TO 128:T(L)=99:NEXT L
86 RETURN
```

NORTHERN TECHNOLOGIES

6030 North 43 Road, Manton, MI 49663
(616)824-6633   BBS(616)824-6026

CARD COLLECTOR

Keep track of your card collection with this, OS9 Level II, program. List to the screen or printer, by name, team or position. Edit, expand, or shrink files.
ONLY $9.95 + $2.00 S&H

PRINTERS

Star Micronics NX-1000 Rainbow, 7 color printing, 144 cps draft/36 cps NLQ, 6.5k print buffer, 'paper parking', friction and tractor feed, Hi Res graphics.
ONLY $260.00 + $12.00 S&H

MODEMS

Avatex 1200e, 300/1200 transmission speed, auto dial/auto answer, 8 front panel lights, two year manufacturer's warranty.
ONLY $80.00 + $3.00 S&H

SmarTeam 2400AT, 300/1200/2400 transmission speed, auto dial/auto answer, call progress detection, 6 self test modes, 8 indicator lights, AT command set, two year manufacturer's warranty.
ONLY $175.00 + $3.00 S&H

Smart One 2400X, 300/1200/2400 transmission speed, auto dial/auto answer, 8 indicator lights, two year manufacturers warranty, Hayes compatible, made in the U.S.A.
ONLY $160.00 + $3.00 S&H

DISKS

5 1/4" DSDD..$.40 ea
3 1/2" DSDD.......................................$1.30 ea
5 1/4" DSHD..$.80 ea
All disks please include $2.00 shipping and handling.

DISK FILES

5 1/4" Disk Holder, holds 75 5 1/4" disks..........ONLY $8.75 ea
3 1/2" Disk Holder, holds 45 3 1/2" disks..........ONLY $7.50 ea
5 1/4" Locking Holder, holds 75 5 1/4" disks, keep your disks away from unauthorized users.
ONLY $12.50 ea
Copy Holder, w/top copy clip, non skid feet, detachable line guide.
Only $12.95 ea

DISK CLEANER KITS

5 1/4" kit..Only $6.95 ea
3 1/2" kit..ONLY $6.50 ea
All above items add $2.00 S&H.

Cash, Check or Money Order. No COD's please........

* EXTENDED *
ADOS-3

* Built-in RAMdisk * Point-and-pick file select menu *

Not a new version of ADOS-3, but a new product that shares space with ADOS-3 in a 16K EPROM. Arrow-key selection of files to execute, LOAD, COPY, KILL or SCAN. The BACKUP command is doubled in speed for full disks, proportionately faster for partly full disks. (BACKUPs to or from the RAMdisk typically take 5 to 20 sec.) • BACKUP-with-format • Wild-card COPY and KILL, with optional prompting for individual files • Date (or date/time with hardware clock) displayed for files in the directory, printed on LLISTings • DATE$ function • Key repeat • Block move/copy of BASIC program lines • Text screen printer dump • Auto-reboot of a BASIC program or the DOS command • Parallel printing • Read/write/format 35/40 tracks on 80-track drives • Supports 3 double-sided drives plus 2 RAMdrives • Allows different numbers of tracks on different drives • Shares the original's excellent compatibility with commercial software. For 128K CoCo 3 with ADOS-3 (RAMdisk use requires 512K). Includes information on having an EPROM burned (cost is $15) after configuring Extended ADOS-3. Disk, **$39.95.** Extended ADOS-3 plus ADOS-3, **$64.95.** Driver for Disto real-time clock, **$5.** Adapter for controllers lacking 28-pin socket, **$10.** SmartWatch real-time clock (Tandy 25-1033 equiv.), **$35** (Drivers for Ext. ADOS-3 and OS-9 included; usable in 28-pin socketed controllers or in Rompack, **$10).**

"...will blow your socks off...impossible to give Extended ADOS-3 anything other than a rave review."
— Rainbow, October 1989.

"Flawless, compatible operation with just about everything under the sun...by far the most USEFUL product ever devised for the Color Computer."
— CoCo Clipboard, Sept/Oct 1989.

ADOS-3 (reviewed July 1987)

Customize default startup message, colors, screen width, baud rate, step rates, processor speed, number of tracks (35, 40, or 80). Disk I/O and printing are reliable at double CPU speed. Extra commands such as FAST, SLOW, AUTO, RUNM, SCAN, CAT, PRT ON/OFF. Keystroke macros, arrow-key scroll through BASIC programs, edit/repeat of last command, auto-edit of error line, ML monitor, lots more. Usable as a disk utility or in EPROM. 128K Coco 3. EPROM-burning (cost is $15-20) information provided. Disk, **$34.95.** **ADOS** for CoCo 1 and 2 Disk, **$27.95.**

FOR OS-9: SmartWatch real-time clock with driver, **$30.00;** in Rompack, **$40.00.**

SPECTROSYSTEMS

11111 N. Kendall Dr.
Suite A108
Miami, FL 33176
(305) 274-3899

PLEASE ADD $2 SHIPPING • NO DELAY ON PERSONAL CHECKS
WE CANNOT ACCEPT CREDIT CARDS

A New Look for OS-9

by Dale L. Puckett
Contributing Editor

This month, *MVFinance* brings *Finance* (March 1984, Page 298) into a new decade of mice and windows — just in time for the business issue. The OS-9 Spotlight features Eric Chrichlow's *ShellMate*, a program that helps you manage OS-9 files with ease.

As you probably guessed from last month's column, we can expect to see some improvements in OS-9 Level II. The BASIC09 tutorial code provided here shows how the new `gfx2` routines make it much easier to write OS-9 windowing programs. When you compare the set-up code required by *MVFinance* to the same sequence from *DoMenu* in our November '88 column, you'll notice it is only one-third the length of the original. The code is also much easier to read and understand. Do keep in mind, however, the code presented here will not run using the currently available `gfx2` module.

Defining the Environment

Many programmers often skip an essential step when they begin a new project. They sit down at a keyboard and start entering code before planning the program. If the program is short, there's usually no problem. However, once the program grows beyond a page or two of code, they pay the price in frustration.

I prefer to make decisions concerning program flow and determine the variables and constants I'll need before I start typing. This lets me use BASIC09's `DIM` statement to

---

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP*: on packet-radio,* KOHYD @ N4QQ*; on GEnie,* D.PUCKETT2*; and on CIS,* 71446,736.

OS-9 Level II

The Listing: `MVFinance`

```
PROCEDURE MVFinance
0000      (* Adding windows to Finance
001C      (* Copyright 1990 Dale L. Puckett
003D
003E      (* Window type defs.
0052      DIM WT_NBox,WT_FWin,WT_FSWin:INTEGER
0061      DIM WT_SBox,WT_DBox,WT_PBpox:INTEGER
0070      WT_NBox:=0 \WT_FWin:=$0301 \WT_FSWin:=$0302
0087      WT_SBox:=3 \WT_DBox:=4 \WT_PBox:=5
009D
009E      (* Menu defs
00AA      DIM MN_Move,MN_Clos,MN_Grow,MN_Uscrl:INTEGER
00BD      DIM MN_Dscrl,MN_Rscrl,MN_Lscrl:INTEGER
00CC      DIM MN_Tndy,MN_File,MN_Edit:INTEGER
00DB      DIM MN_Styl,MN_Font,MN_Char:INTEGER
00EA      DIM MN_Invest,MN_Deprec,MN_Loan:INTEGER
00F9      MN_Move:=1 \MN_Clos:=2 \MN_Grow:=3
010E      MN_Uscrl:=4 \MN_Dscrl:=5 \MN_Rscrl:=6
0123      MN_Lscrl:=7 \MN_Char:=8 \MN_Tndy:=20
0138      MN_File:=21 \MN_Edit:=22 \MN_Styl:=23
014D      MN_Font:=24 \MN_Invest:=33 \MN_Deprec:=34 \MN_Loan:=35
0169
016A      (* Buffer defs
0178      DIM Grp_Font,Grp_Clip,Grp_Ptr:INTEGER
0187      DIM Grp_Pat2,Grp_Pat4,Grp_Pat6:INTEGER
0196      Grp_Font:=200 \Grp_Clip:=201 \Grp_Ptr:=202
01AB      Grp_Pat2:=203 \Grp_Pat4:=204 \Grp_Pat6:=205
01C0
01C1      (* Font Buffers
01D0      DIM Fnt_S8x8,Fnt_S6x8,Fnt_G8x8:INTEGER
01DF      Fnt_S8x8:=1 \Fnt_S6x8:=2 \Fnt_G8x8:=3
01F4
01F5      (* Mouse Pointers
0206      DIM Ptr_Arr,Ptr_Pen,Ptr_Lch,Ptr_Slp:INTEGER
0219      DIM Ptr_Ill,Ptr_Txt,Ptr_Sch,Ptr_None:INTEGER
022C      Ptr_Arr:=1 \Ptr_Pen:=2 \Ptr_Lch:=3 \Ptr_Slp:=4
0248      Ptr_Ill:=5 \Ptr_Txt:=6 \Ptr_Sch:=7 \Ptr_None:=0
0264
0265      (* Pattern Buffers
0277      DIM Pat_Sld,Pat_Dot,Pat_Vrt,Pat_Hrz,Pat_Xhtc:INTEGER
028E      DIM Pat_Lsnt,Pat_Rsnt,Pat_Sdot,Pat_Bdot:INTEGER
02A1      Pat_Sld:=0 \Pat_Dot:=1 \Pat_Vrt:=2 \Pat_Hrz:=3 \Pat_Xhtc:=4
02C4      Pat_Lsnt:=5 \Pat_Rsnt:=6 \Pat_Sdot:=7 \Pat_Bdot:=8
02E0
02E1      (* Window regions for Mouse
02FC      DIM WR_Cntnt,WR_Cntrl,WR_OfWin:INTEGER
030B      WR_Cntnt:=0 \WR_Cntrl:=1 \WR_OfWin:=2
0320
0321      (* Data type to hold mouse packet
0342      DIM valid,fire,mx,my,area,sx,sy:INTEGER
0361
0362       (* Mouse settings
0373       DIM scanrate,timeout,follow:INTEGER
0382       scanrate:=3 \(* update rate (1/60th sec ticks) for the mouse
03B8       timeout:=1 \(* # ticks till packet goes into quite mode
03EA       follow:=1 \(* update cursor when mouse moves, 0 = no follow.
0422
0423       DIM ButtonDown,ButtonUp:INTEGER
042E       ButtonDown:=1 \ButtonUp:=0
043C
043D       (* Dim a variable to hold the 6809 stack during a SysCall
0476       TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
049B       DIM stack:registers
04A4
04A5       (* SysCall constants
04B9       DIM I_Dup,I_Getstt,I_Setstt,F_Sleep:BYTE
04CC       I_Dup:=$82 \I_Setstt:=$8E \I_Getstt:=$8D \F_Sleep:=$0A
04EC
04ED       DIM pathnum,oldpath(3),newpath:BYTE
0501       DIM key:STRING[1] \ DIM programname:STRING
0514
0515       (* Dimension arrays for window and menus
053D       DIM Finwin(6):STRING \(* Window Descriptor
055D       DIM TanMen(8):STRING \(* Tandy Menu
0576       DIM FilMen(1):STRING \(* File Menu
```

reserve memory and describe a program's environment for the reader — often it's me, six months later. When you write code this way, you can always refer back to the beginning of the program's listing to find the value of a constant or determine what a particular variable is being used for.

Additionally, you'll find that once you have written a solid shell for one *Multi-Vue* program, you can use that code over and over again in many other programs, with only simple modifications. If you define often used constants, you can refer to them by name throughout the remainder of the coding. I dislike code that forces me to remember what an esoteric value like $CA will do for me.

I reorganized the code that initializes the windows for *MVFinance* to make it easier to read and understand. In *DoMenu*, I grouped all the `DIM` statements together — more than 100 of them — and initialized all the variables. With this approach I had to

Move into the '90s with DISTO SUPER PRODUCTS

Super Controller II
NOW AVAILABLE AT YOUR RADIO SHACK STORE PART # 90-2009
UNDER OS-9: Buffered read/write sector achieved without halting the CPU means no loss of time or keyboard strokes. Mini Expansion Bus for 1 Super Add-On. One DOS included. **$130**

Super Controller I
- Sockets for 4 DOSes
- Mini Expansion Bus for 1 Super Add-On.
- One DOS Included. $99

Mini Controller I
- Lowest Price Anywhere!
- Sockets for 2 DOSes
- Accepts 24/28 pin DOS
- One DOS Included. $75

NEW! GET 1 MEG
Of memory in your COCO 3 with DISTO's
1 MEG Upgrade Kit.
- Requires a 512K COCO 3 and soldering experience.
- Kit includes 512K mem and all necessary hardware.
- OS9 Drivers, by Kevin Darling, included.

ONLY $199
Zero K Kit $159

MEB II
A carrier to plug in 1 Super Add-On. Multi-PaK required. $35
RS-232 PAK
Compatable with RS Deluxe RS-232 Pak. DB-25 cable included. Multi-Pak rqd. $55
RGB to MONO
Monochrome video & Audio adapter. $35

NEW ! From Rainbow's author, Tony DiStefano:
"A Full Turn of the Screw"
The complete collection of "Turn of the Screw" articles from Jan '83 to Jul '89. $20

Super Add-Ons
4IN1 Multi-Board Adapter
Hard Disk, Real Time Clock Serial & Parallel Ports. Req. SC-II or MEB-II. $130
3IN1 Multi-Board Adapter
Real Time Clock, Serial & Parallel Printer Ports. $75
RTC & Printer Interface
Rtime & Parallel Port. $35
MPROM Adapter
EPROM Programmer. $55
Hard Disk Adapter
SCSI or SASI. No Multi-Pak needed if used with SC-I or SC-II. RGB DOS and Hyper I/O supported. $40
HDISK & RS-232
Same as above but with RS-232 Serial Port. $70
RS-232 Adapter
A true Serial Port. $40

SR-3 • 512K Upgrade $90
Upgrades a COCO 3 to 512K memory. Ramdisk, printer spooler and memory test software included! Zero K $25

CRC Inc.
11 Boul. Des Laurentides, Laval, Quebec, Canada H7G 2S3
Include S&H of $4 or $8 if order exceeds $70 MC/Visa Accepted
1-514-967-0195
Sorry: No personal cheques

```
058E      DIM InvMen(3):STRING \(* Investment Menu
05AC      DIM DepMen(3):STRING \(* Depreciation Menu
05CC      DIM LonMen(5):STRING \(* Loan Menu
05E4
05E5      DIM menu_id,menu_item:INTEGER
05F0      DIM Enable,Disable:INTEGER
05FB      Enable:=1 \Disable:=0
0609
060A      DIM stype,xsiz,ysiz,fore,back,bord:INTEGER
0625      DIM window,wtype:INTEGER
0630      window:=WT_FSWin \wtype:=window
0640
0641      DIM row,col:INTEGER \row:=0 \col:=0
065A
065B      (* Dimmension variables for Finance procedures
0689      DIM invest,deposit,rate,value,interest,period,years:REAL
06A8      DIM pricepaid,pricesold,depreciation,salvagevalue:REAL
06BB      DIM months,periods:INTEGER
06C6
06C7      (* Operating Program starts here
06E7      SHELL “tmode -pause”
06F7      ON ERROR GOTO 9000
06FD
06FE      (* Check for proper window type and size and fix
072E      RUN gfx2(“Winfo”,stype,xsiz,ysiz,fore,back,bord)
0759      IF stype<>7 THEN
0765        RUN gfx2(“DWEnd”) \RUN gfx2(“DWSet”,7,0,0,80,24,1,0,2)
0797        xsiz:=80
079E      ENDIF
07A0      IF xsiz<80 THEN
07AC        RUN gfx2(“DWSet”,0,0,0,80,24,1,0)
07CE      ENDIF
07D0
07D1      (* Set up palettes
07E3      RUN gfx2(“Palette”,0,$3F) \RUN gfx2(“Palette”,1,$0A)
080F      RUN gfx2(“Palette”,2,$00) \RUN gfx2(“Palette”,3,$1D)
083B
083C      (* Turn on mouse, use arrow cursor
085E      RUN gfx2(“SetMouse”,scanrate,timeout,follow)
087D      RUN gfx2(“GCSet”,Grp_Ptr,Ptr_Arr)
0894
0895      (* Display Menu Bar
08A8      RUN gfx2(“Title”,Finwin,”Multi-Vue Finance”,80,24,5)
08D7
08D8      (* Set up each menu and items
08F5      RUN gfx2(“Menu”,Finwin,1,”Tandy”,MN_Tndy,10,8,TanMen,Enable)
0926      RUN gfx2(“Item”,TanMen,1,”Calc”,Disable)
0946      RUN gfx2(“Item”,TanMen,2,”Clock”,Disable)
0967      RUN gfx2(“Item”,TanMen,3,”Calendar”,Disable)
098B      RUN gfx2(“Item”,TanMen,4,”Control”,Disable)
09AE      RUN gfx2(“Item”,TanMen,5,”Printer”,Disable)
09D1      RUN gfx2(“Item”,TanMen,6,”Port”,Disable)
09F1      RUN gfx2(“Item”,TanMen,7,”Help”,Enable)
0A11      RUN gfx2(“Item”,TanMen,8,”Shell”,Enable)
0A32
0A33      RUN gfx2(“Menu”,Finwin,2,”File”,MN_File,6,1,FilMen,Enable)
0A63      RUN gfx2(“Item”,FilMen,1,”Quit”,Enable)
0A83
0A84      RUN gfx2(“Menu”,Finwin,3,”Investments”,MN_Invest,18,3,InvMen,Enable)
0ABC      RUN gfx2(“Item”,InvMen,1,”One Investment”,Enable)
0AE6      RUN gfx2(“Item”,InvMen,2,”Regular Deposits”,Enable)
0B12      RUN gfx2(“Item”,InvMen,3,”Desired Value”,Enable)
0B3B
0B3C      RUN gfx2(“Menu”,Finwin,4,”Depreciation”,MN_Deprec,16,3,DepMen,Enable)
0B75      RUN gfx2(“Item”,DepMen,1,”Annual Rate”,Enable)
0B9C      RUN gfx2(“Item”,DepMen,2,”Total Amount”,Enable)
0BC4      RUN gfx2(“Item”,DepMen,3,”Salvage Value”,Enable)
0BED
0BEE      RUN gfx2(“Menu”,Finwin,5,”Loans”,MN_Loan,18,5,LonMen,Enable)
0C1F      RUN gfx2(“Item”,LonMen,1,”Regular Payments”,Enable)
0C4B      RUN gfx2(“Item”,LonMen,2,”Last Payment”,Enable)
0C73      RUN gfx2(“Item”,LonMen,3,”Term”,Enable)
0C93      RUN gfx2(“Item”,LonMen,4,”Balance”,Enable)
0CB6      RUN gfx2(“Item”,LonMen,5,”Cost of Loan”,Enable)
0CDE
```

OS-9 Spotlight: *ShellMate*

ShellMate, the commercial version of Eric Crichlow's PD file management program was released by Hyper-Tech Software in February. This point-and-click program is similar to the *DiskMaster* program on the Amiga.

ShellMate is essential first fare for the OS-9 beginner and a productivity booster for old timers. It is one of the first commercial programs to fully use the *Multi-Vue* windowing system and is both friendly and powerful. Beginners will find it much easier to copy or move files by pointing and clicking. Old timers will love the ability to select a large number of files and perform a given task on them with one click of the mouse button. However, you will need a minimum of 256K of memory in your CoCo 3 to use *ShellMate*.

The package from Hyper-Tech, 4341 Gannet Circle, No. 174, Las Vegas, NV 89103, also contains an AIF and icon file. The AIF file goes in your applications folder. The icon file should be moved into the `/DD/CMDS/ICONS` folder. You'll need at least 40K of free memory when you run *ShellMate*.

ShellMate divides your Color Computer screen into three sections: Overlay windows display both source and destination directories; all available commands are listed in the center; and the standard *Multi-Vue* menu bar appears along the top of the screen. You start by selecting a file or files in the source directory. You then perform a command selected from the list in the center of the screen. If you are copying or moving a file, it is placed in the destination directory list on the right. While selecting, you can move down the directory tree by clicking on the name of a subdirectory (displayed in a different color than a standard file). To move back up the tree, click on the Parent button in the center. Other buttons let you select or clear all files in a directory. You can even create new directories with the `MakDir` button.

ShellMate has several bells and whistles that let you do much more than a standard file manager providing only copy, delete, rename, list and print services. For example, additional *ShellMate* commands let you list files contained in a standard OS-9 archive file, dearchive those files, or create a new archive. To use these buttons the `Ar` module must be resident in your current execution directory.

If you create or download a lot of VEF graphics files, you'll love *ShellMate*. By pushing a single button after selecting a picture file, you can run `VEFShow` to display a picture. GIF pictures can be displayed with another button that runs the `GIFOS9` command. As with any excellent *Multi-Vue* application, *ShellMate* gives you full access to all Desk Accessories under the Tandy menu. You'll find this new OS-9 application is well thought-out and useful — an excellent first release for Eric Crichlow. ❑

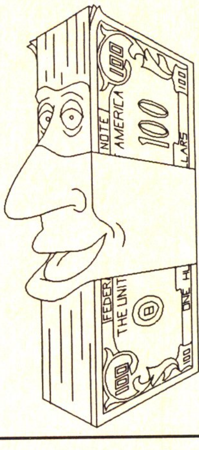
```
0CDF      (* Setup the window: Turn off text cursor first
0D0E      RUN gfx2("CurOff") \RUN gfx2("WnSet",WT_FSWin,Finwin)
0D33      RUN gfx2("CurOn")
0D40
0D41      (* Main Loop
0D4D      LOOP  \(* Do this forever
0D61        REPEAT
0D63          RUN gfx2("Mouse",valid,fire,mx,my) \ UNTIL fire=ButtonUp
0D90
0D91        RUN gfx2("OnMouse",0)
0DA3        RUN gfx2("Mouse",valid,fire,mx,my,area,sx,sy)
0DD3        IF valid<>0 AND fire=ButtonDown AND area=WR_Cntrl THEN
0DEF          GOSUB 1000
0DF3        ENDIF
0DF5      ENDLOOP
0DF9
0DFA 1000 RUN gfx2("GetSel",menu_id,menu_item)
0E15
0E16      IF menu_id=MId_Gro THEN
0E24        wtype:=window
0E2C        GOSUB 8000
0E30        RETURN
0E32      ENDIF
0E34
0E35      IF menu_id=MId_Mov THEN
0E43        wtype:=window
0E4B        GOSUB 8000
0E4F        RETURN
0E51      ENDIF
0E53
0E54      IF menu_id=MN_Clos THEN GOTO 9010 \ ENDIF
0E66      IF menu_id=MN_Tndy THEN GOSUB 2000 \ ENDIF
0E78      IF menu_id=MN_File THEN
0E85        IF menu_item=1 THEN
```

Stay on top of your finances **With Coco-Accountant 3**

If you're like most of us, keeping track of your finances is a hassle. Messy checkbooks, boxes full of old receipts, and panic at income tax time. But your Color Computer 3 can turn you into a financial wizard if you have **Coco-Accountant 3.**

This full-featured, home and small business accounting program answers the three big questions we all have about our money: Where did it come from? Where did it go? And what can I deduct from my income taxes?

CoCo-Accountant is easy to use and menu-driven. Just set up a list of accounts and start entering your transactions. Checks, credit cards, cash, paycheck information, interest. In any order. Just toss it in and CoCo-Accountant sorts it out. Here's what Coco-Accountant will do:



- List and total transactions by account, for any month or the whole year.
- List and total transactions by payee or income source, for any month or whole year.
- List and total transactions by month, with income, expense and cash flow summaries.
- Quick year to date account and month summaries.
- Printed spreadsheet showing activity by account and month for the whole year!
- List and total tax-deductible expenditures and taxable income by account.
- Quick, easy checkbook reconciliation.

Toll Free Orders
1-800-628-2828
Ext. 850

Coco-Accountant 3 will run on any CoCo 3 with a disk drive. And it's only **$39.95.** (We also have Coco-Accountant 2, with most of these features, for 64K Color Computers at $34.95). Send check, money order or credit card information to **Federal Hill Software** at the address below or call our **Toll-Free Order Line at 1-800-628-2828 Ext. 850.** Order now and bring your finances into the Computer Age!

Federal Hill Software 8134 Scotts Level Rd., Baltimore, Md. 21208 Info. 301-521-4886

leaf through several pages of code each time I wanted to determine which data type a variable contained. To make things easier, this time I have grouped the `DIM` and initialization statements for like objects. You'll find the window types, buffer definitions and mouse pointers, etc., together.

Commands That Make It Possible

Examine the code that sets up the window and menu bar for *MVFinance*, and compare it to the same code in *DoMenu*.

> ***M**ulti-Vue* is finally something the beginning BASIC09 programmer can approach without fear. Three new gfx2 commands make this possible.

Multi-Vue is finally something the beginning BASIC09 programmer can approach without fear. Three new `gfx2` commands make this possible. For example, the following line sets up the title bar:

```
run gfx2(“Title”,FinWin,"Multi-V
ue Finance",72,20,5)
```

Likewise, a single line is required for each menu as well as each item under a menu:

```
run gfx2(“Menu”,FinWin,1,"Tandy”
,MN_Tndy,10,8,TanMen,Enable)
run gfx2(“Item”,TanMen,1,"Calc”,
Disable)
```

A major `gfx2` enhancement makes it much easier to handle the mouse. Special long-winded data-typing statements are no longer needed. For example, this line initializes the mouse:

```
run gfx2(“SetMouse”,scanrate,tim
eout,follow)
```

To read the position and status of the mouse, you can use one of the following

```
0E91              GOTO 9010
0E95            ENDIF
0E97          ENDIF
0E99
0E9A          IF menu_id=MN_Invest THEN GOSUB 3000 \ ENDIF
0EAC          IF menu_id=MN_Deprec THEN GOSUB 4000 \ ENDIF
0EBE          IF menu_id=MN_Loan THEN GOSUB 5000 \ ENDIF
0ED0          RETURN
0ED2
0ED3 2000     (* Tandy Menu routines from DoMenu go here
0F00          IF menu_item=7 THEN
0F0C            RUN gfx2(“OWSet”,1,50,8,30,8,3,2)
0F2E            RUN gfx2(“WnSet”,WT_DBox,Finwin)
0F45            PRINT  \ PRINT “  Use DoMenu code”
0F5C            PRINT “  from November, 1988”
0F75            PRINT “  Rainbow to run items”
0F8F            PRINT “  from Tandy Menu.”
0FA5            FOR count:=1 TO 7000 \NEXT count
0FC3            RUN gfx2(“OWEnd”)
0FD0          ELSE IF menu_item=8 THEN
0FDF              GOSUB 6000 \(* Open a window
0FF4              SHELL “” \(* Start a Shell
1008              RUN gfx2(“OWEnd”)
1015            ENDIF
1017          ENDIF
1019          RETURN
101B
101C 3000     (* Investment Programs
1035          IF menu_item<>0 THEN
1041            ON menu_item GOSUB 3100,3200,3300
1054          ENDIF
1056          RETURN
1058
1059 3100     (* Single Investment
1070          GOSUB 6000 \(* Open Window
1083          PRINT “Future Value of One-Time Ivestment” \ PRINT
10AB          INPUT “Initial Investment? “,invest
10C7          INPUT “Nominal Interest Rate? “,rate
10E6          INPUT “Term in Years, Months? “,years,months
1109          INPUT “Number of compounding periods/year? “,periods
1135          PRINT
1137          rate:=rate/periods/100 \years:=(12*years+months)/12
115D          value:=invest*(1+rate)^(periods*years)
1176          value:=INT(value*100+.5)/100 \interest:=value-invest
119A          GOSUB 6100 \(* Print report
11AD          RETURN
11AF
11B0 3200     (* Regular Deposits
11C6          GOSUB 6000 \(* Open window
11D8          PRINT “Future Value of Regular Deposits” \ PRINT
11FE          INPUT “Amount of each deposit? “,deposit
121E          INPUT “Nominal interest rate? “,rate
123D          INPUT “Term of investment (Years,Months)? “,years,months
126C          INPUT “Number of deposits per year? “,periods
1291          rate:=rate/periods/100 \years:=(12*years+months)/12
12B7          value:=deposit*((1+rate)^(periods*years)-1)/rate
12D8          value:=INT(value*100+.5)/100 \invest:=deposit*years*periods
1301          interest:=value-invest
130D          GOSUB 6100 \(* Print report
1320          RETURN
1322
1323 3300     (* Desired Value
1336          GOSUB 6000 \(* Open window
1348          PRINT “Required regular deposits” \ PRINT
1367          INPUT “Desired final amount? “,value
1385          INPUT “Nominal interest rate? “,rate
13A4          INPUT “Length of investment (Years,Months)? “,years,months
13D5          INPUT “Number of deposits each year? “,period
13FB          rate:=rate/period/100 \years:=(12*years+months)/12
1420          deposit:=value*rate/((1+rate)^(period*years)-1)
1440          invest:=deposit*years*period \interest:=value-invest
145C          GOSUB 6100 \(* Print report
146F          RETURN
1471
1472 4000     (* Depreciation Programs
148D          IF menu_item<>0 THEN
```

```
1499        ON menu_item GOSUB 4100,4200,4300
14AC       ENDIF
14AE       RETURN
14B0
14B1 4100 (* Annual Rate
14C2       GOSUB 6000 \(* Open window
14D4       PRINT "Depreciation Amount" \ PRINT
14ED       INPUT "Original price of item? ",pricepaid
150D       INPUT "Selling price? ",pricesold
1524       INPUT "Depreciation term (Years,Months)? ",years,months
1552       years:=(12*years+months)/12
1567       rate:=1-(pricesold/pricepaid)^(1/years)
157F       rate:=INT(rate*100+.5)
1593       PRINT CHR$(12) \(* clear screen
15A7       PRINT "Depreciation rate (Percent): ";
15C9       PRINT USING "T40,R12.2>",rate
15DC       GOSUB 6200 \(* close
15E8       RETURN
15EA
15EB 4200 (* Total depreciation
1603       GOSUB 6000 \(* open window
1615       PRINT "Depreciation Amount" \ PRINT
162E       INPUT "Original price of item? ",pricepaid
164E       INPUT "Depreciation rate? ",rate
1669       INPUT "Year of depreciation? ",years
1687       rate:=rate/100
1693       depreciation:=pricepaid*rate*(1-rate)^(years-1)
16AF       PRINT CHR$(12) \(* clear screen
16C3       PRINT  \ PRINT "Current depreciation: ";
16E0       PRINT USING "T40,R12.2>",depreciation
16F3       GOSUB 6200 \(* close
16FF       RETURN
1701
1702 4300 (* Salvage Value
1715       GOSUB 6000 \(* Open window
```

lines. However, the second line does not tell you the horizontal and vertical size, the area of the screen or the location of the pointer.

```
run gfx2("Mouse",valid,fire,mx,m
y,area,sx,sy)
run gfx2("Mouse",valid,fire,mx,m
y)
```

While you are waiting for the user to click the mouse button, you can put the mouse to sleep and let other processes running in your Color Computer have more time by using this line:

```
run gfx2("OnMouse",0)
```

Another `gfx2` command that you're sure to love is `Winfo`, which lets you examine the type, size and colors in a window. Check the line I use to make sure I am running *MVFinance* in a window of the proper type.

Subroutines and Forked Processes

I used two separate approaches within *MVFinance* to illustrate two different solutions to the same problem. When a user clicks a mouse on a menu item, he is

SPRING CLEANING SALE!
NEW REDUCED PRICES
TO CELEBRATE THE 90'S!

TITLE	REGULAR PRICE	SALE PRICE
BURIED BUXX	$19.95	$14.95
MUTANT MINERS	$19.95	$14.95
A DIAMOND IN THE ROUGH	$19.95	$17.95
YAHTZZZ	$12.95	$9.95
BURIED BUXX II*	$24.95	$19.95
KILLER A's*	$24.95	$19.95
MILESTONES*	$19.95	$14.95
PICTURE PUZZLES*	$19.95	$14.95
QUANTUM LEAP*	$19.95	$14.95
REVENGE OF THE MUTANT MINERS*	$19.95	$14.95
DISKEASE*	$19.95	$12.95
FONTGEN*	$19.95	$14.95

Prices good through June 30th.
* = Color Computer 3 only.

JR & JR SOFTSTUFF
P.O. BOX 118 • Lompoc, CA • 93438 • (805) 735-3889

MasterCard
Orders accepted 24 hours a day.
All programs on diskette only.
VISA

All orders add $3.00 shipping. C.O.D. orders $4.00 additional

SPECIAL DEAL ON 500 PROGRAMS IS BACK!

BACK BY POPULAR DEMAND! GET OUR LATEST 50 DISKS OR TAPES FULL OF OVER 500 PROGRAMS! HERE IS WHAT YOU'LL RECEIVE:

- Over 250 Utility/Home application Programs including a Word Processor, DataBase, Spreadsheet, Disk Utilities, Business Software, Electronics Series, Educational Programs for Kids, plus much more!
- Over 200 Exciting Games (15 From Tom Mix), Including P51 Flight Simulator, SailorMan, The King, Family Feud, Air Attack, Moneyopoly, plus much more!
- Over 30 Adventures, Including Martian Crypt, Rambo, Dracula, Plus 32K Graphic Adventures!

Individual issues sell for $9.00 each or $450.00 for all 50. We SLASHED the price to only $ 150.00 !

REG. $450 NOW ONLY $150.00

TURN TO PAGE 23 FOR A LISTING OF OUR BACK ISSUES

•• THIS MONTH ONLY ••

Buy this package of 500 programs and receive a FREE 6 month subscription.

VISA MasterCard

RAINBOW CERTIFICATION SEAL

T&D SOFTWARE • 2490 MILES STANDISH • • HOLLAND MI 49424 • (616) 399-9648 •

essentially telling the computer to perform the task advertised under the menu bar. It is up to your program to make this possible.

I used subroutines to run the tasks under the Investment and Depreciation menus. Items under the Loan menu are run by forking a task in a new window. The subroutine approach is easy to follow. In fact two techniques can be used: The Investment menu uses a decision tree, and the Depreciation menu uses an `ON Menu_Item GOSUB 4100, 4200, 4300` statement.

The Loan menu uses both the `ON Menu_Item GOTO` statement and forks a process in a new window. I needed the `SysCall` statements in the subroutine at 9000 to duplicate the input, output and error paths on the fly and to use the `F$Sleep` system call.

A new `gfx2` command named `WnSet` is used to display a new window and menu bar. To bring up the *MVFinance* window, use the statement:

```
run gfx2("WnSet",WT_FSWin,FinWin)
```

`FinWin` is the array that defines the window. `WT_FSWin` is an integer variable that actually contains two parts: The lower significant byte contains the window type, and the upper byte tells the system if the window can be either moved or resized or both.

By combining this feature with a menu that forks a process in a new window, you can start more than two calculation subroutines going in two or more windows on the same screen. You can experiment when I present the four additional procedures for the Loan menu next month.

That's it for April. I hope to have more information about OS-9 Level II on the Color Computer in May. ❑

```
1727      PRINT "Salvage Value" \ PRINT
173A      INPUT "Original price of item? ",pricepaid
175A      INPUT "Depreciation term (Years,Months)? ",years,months
1788      INPUT "Depreciation rate? ",rate \rate:=rate/100
17AF      salvagevalue:=pricepaid*(1-rate)^years
17C3      PRINT CHR$(12) \(* clear screen
17D7      PRINT  \ PRINT "Salvage value: ";
17ED      PRINT USING "T40,R12.2>",salvagevalue
1800      GOSUB 6200 \(* close
180C      RETURN
180E
180F 5000 (* The subroutine to Fork Loan programs
1839      (* as a separate processes appears next month
1866      RETURN
1868
1869 6000 RUN gfx2("OWSet",1,10,10,60,12,2,3)
188E      RUN gfx2("WnSet",WT_DBox,Finwin)
18A5      RUN gfx2("Select") \RUN gfx2("CurOn")
18C0      RETURN
18C2
18C3 6100 PRINT CHR$(12) \ PRINT "Amount Invested: ";
18E1      PRINT USING "T40,R12.2>",invest
18F4      PRINT "Value of accumulated Interest: ";
1918      PRINT USING "T40,R12.2>",interest
192B      PRINT "Final Value of Your Investment: ";
1950      PRINT USING "T40,R12.2>",value
1963
1964 6200 (* close the window on mouse click
1989      PRINT
198B      PRINT "Click Mouse to continue!"
19A7      REPEAT
19A9        RUN gfx2("Mouse",valid,fire,mx,my)
19CA      UNTIL fire=1
19D5      RUN gfx2("Owend")
19E2      RETURN
19E4
19E5 8000 (* Display window after its been moved
1A0E      RUN gfx2("CurOff") \RUN gfx2("WnSet",wtype,Finwin)
1A33      RUN gfx2("CurOn") \row:=0 \col:=0
1A4E      IF wtype=$0302 THEN
1A5B        RUN gfx2("SBar",col,row)
1A71      ENDIF
1A73      RUN gfx2("GCSet",Grp_Ptr,Ptr_Arr)
1A8A      RETURN
1A8C
1A8D 9000 (* All errors come here
1AA7      PRINT "Error="; ERR
1AB3      PAUSE
1AB5 9010 SHELL "tmode echo"
1AC6      RUN gfx2("GCSet",Ptr_None,Ptr_None)
1ADD      RUN gfx2("CurOn")
1AEA      END
```

THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum). Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

THE BOOK - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jystk, sound, serial port, and using cassette and disk. $18.00 + $1.50 s/h.

THE ADDENDUM - Picks up where the BOOK left off. Describes ALL the CoCo 3 enhancements & how to use them with assembly language. The most complete GIME spec. WOW - Super-Res Graphics, Virtual Memory, New Interrupts, and more information not available elsewhere. Find out what the CoCo 3 can really do. $12.00 + $1.00 s/h.

COCO 3 SPECIAL Start your CoCo library right. See what the CoCo can really do and save money - buy the BOOK and ADDENDUM for only $27.00 + $2.00 s/h.

US check or money order. RI orders add 6% sales tax

TEPCO
68 James Court
Portsmouth, RI 02871

See Us On DELPHI

Looking for Connectors

by Marty Goodman.
Contributing Editor

Where can I get 34-pin female dual-row connectors for 3½-inch disk drives? Radio Shack just told me they don't carry 34-pin connectors. How can I get software to allow me to use more than 35 tracks? Can this be done for CoCo Max 3*?*

Michael F. Trombley, Jr.
Ware, Massachussetts

Page 141 of the 1990 Radio Shack catalog indicates that Radio Shack does sell the proper 34-pin connector (Cat. No. 276-1525) for use with 3½-inch disk drives. The 276-1564 connector is the proper one to use with 5¼-inch drives. These items are not new and have been in the catalog for years. If you replace the original Disk ROM with *ADOS* burned into an EPROM (see ad in THE RAINBOW), most disk-based programs will work with 40- and 80-track drives. *CoCo Max 3* may be an exception, however, because it does not go through the disk ROM for its disk access, and so a modified ROM does not affect its disk operation.

Bruce Replies

Several folks have asked me about using 80-track, TEAC 55F, 5¼-inch floppy drives to read 40-track disks. Older versions of those drives (the ones with a single TI 1922-00 flatpack chip surrounded by 74LS-series, TTL DIP chips) can be set to double step (skip every other track when stepping) if you install R14 (a 150 ohm, ¼-watt resistor). When set in this fashion, they can reliably read disks written with 40-track drives. They can also format a disk in such a way that a 40-track drive can read the disk. However, it's not a good idea to try to use these drives to write to a disk that has been formatted on a true 40-track drive. A user can install a switch that hooks R14 in and out to put the drives in normal- and double-step/40-track modes.

Bruce Isted
Calgary, Alberta
Canada

Thanks, Bruce, for the tip. Older TEAC 5¼-inch 80-track drives are the only ones I know of that allow for such hardware-based double-step control. Of course, you can accomplish the same thing with proper driver software. Art Flexser incorporated this into *ADOS3* and *Extended ADOS3*. Modifying the OS-9 device driver for Disk I/O to allow double-stepping should not be difficult.

Atari Compatible?

Can I use an Atari drive on my Color Computer?

Bruce Bell
Rockmart, Georgia

Older 5¼-inch drives used by the Atari 400, 800 and 130ST cannot be used on a Color Computer; the logic board on the drive mechanism is completely different than the IBM standard-type used by CoCo drives. However, the drive and logic board used by the Atari 520ST, 1040ST and their successors is standard and can be used with a Color Computer. These are double-sided, 80-track, 3½-inch drives. Apart from setting the drive select properly and using proper cabling, you must also be careful to alter the terminating resistors when using an Atari 520ST-type drive on the CoCo, because the Atari ST systems use peculiar terminating resistances.

How to Make Y

How can I make a Y cable for my Color Computer's expansion port?

Jocelyn Girard
Quebec

Y cables for the CoCo expansion port are made using Kell AM brand male and female IDC edge card connectors along with 40-conductor ribbon cable. These connectors cost $3 to $5 each, and they must be used with Kell AM female row-reversing connectors because their means of hooking to the ribbon cable is a mirror image of most ordinary female edge card connectors.

The male connectors are tricky to crimp on the cable. If you don't have the special crimping die used for mass production, you must push each of the contacts in, one at a time, with a small nail after the usual crimping operation is done; otherwise unreliable contact results. This is why making such Y cables is usually outside the scope of the average do-it-yourselfer; it's better to get them from a RAINBOW advertiser. I don't readily recommend the use of such Y cables because they can cause unreliable system operation, especially with disk access.

It is possible to make a male-to-male edge-card adaptor if you have access to double-sided printed circuit board fabrication

---

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

technology. Every trace must be run through the board on its way to the other edge-card connector. Such an adaptor can turn a female 40-pin IDC edge-card connector into a male, allowing its use with standard 40-pin female edge-card connectors. CRC/Disto used this trick to make an adaptor for 34-pin edge-card connectors used in disk drives. To my knowledge they have not made one for 40-pin edge card connectors.

Tandy External on CoCo

How do I use a Tandy external 3½- or 5¼-inch drive package designed for use with a 1000 EX or HX on a Color Computer?

Dick Reitz
Houston

The external drives for the 1000EX and HX are standard 5¼- and 3½-inch drives that are compatible with the Color Computer. They are packaged in a plastic box without a power supply. Tandy uses a custom 30-pin cable that supplies power to the drive from the main computer.

I recommend opening up the box, discarding the Tandy cable and making your own ordinary 34-pin cable for use with the CoCo disk controller. You will also have to provide power to the drive (+5 and +12 volts, regulated), then properly jumper and terminate your CoCo drive system.

Need Modem to Fit Budget

What kind of modem should I buy? I've been advised to purchase the DC Modem Pak and a Multi-Pak Interface, but these are too expensive. I have DeskMate.

Tim Arview
West Frankfort, Illinois

I recommend purchasing a generic, external, 1200-baud modem, which should be available from computer mail-order houses for under $65. Such modems can be connected to the 4-pin serial port on the back of the CoCo3. When used with any of a number of shareware or commercial disk-based terminal programs (*Delphiterm*, *Vterm*, *GregETerm*), these modems allow you to download from any Color Computer bulletin board to your disk.

DeskMate and other OS-9 software is another matter. OS-9 software requires a hardware RS-232 pack and a Y cable or Multi-Pak Interface. RS-232 packs are available from Orion and CRC/Disto (see ads in THE RAINBOW) and Multi-Pak substitutes are available from Orion and Howard Medical.

Multi-Pak Interface Problem

My Multi-Pak will not recognize the disk controller in Slot 4, and moving the selector switch to the slot occupied by an auto-execute ROM Pak causes the computer to crash. I have upgraded this Multi-Pak according to your instructions in the October 1988 RAINBOW and have determined that the power supply is OK. I have not jostled the Multi-Pak or CoCo and have been using a Locking Plate from Gimmesoft to keep the CoCo and Multi-Pak together. My disk controller works fine when plugged directly into the CoCo. What suggestions can you offer?

Leroy Guse
Greenleaf, Wisconsin

It would help to know what kind of Multi-Pak you have. I suggest using a schematic of the Multi-Pak and an oscilloscope to check for a bad chip on each address and data line on both sides of the buffer chips. Check the functioning of the CTS line since it is used in recognizing the disk ROM and ROM Paks.

Also, type `POKE &HFF40,1` and see if the disk drive light on Drive 0 comes on. If it does, it means the SCS line is working. Both Multi-Paks use the same buffer circuitry on the address and data lines. The older Multi-Pak uses small-scale logic plus one small PAL chip to handle slot selection, where the new Multi-Pak uses a large, custom chip. The most common problem I've encountered with bad Multi-Paks is a blown address or data buffer chip. I've also seen the power supplies go bad. However, I've not seen a Multi-Pak with a dead PAL or custom-slot select chip, though I suppose it could happen.

Act Like a Dragon

How can I make my CoCo operate as if it were a Dragon 32/64 computer? I want to run Dragon programs on my CoCo. I've tried to put my CoCo into 64K mode and load Dragon BASIC into it, but it doesn't work.

Edmund Sobon
Brampton, Ontario

You're most likely wiping out the very code that allows the computer to use the tape recorder as you are using it! You need to load the Dragon BASIC into lower memory and use a program written in assembly language that turns off the interrupts and moves that code into upper memory where you want it. I'm still not sure the result will be an environment in which Dragon software will run on the CoCo, but it's worth a try. The old Dragon computer was very similar to the CoCo 1, but featured a built-in hardware serial port and a clever addition to the keyboard circuitry that created a parallel printer port.

Creating Variables

Page 16 of the CoCo 3 manual states "You can use any two characters from A to Z for a variable." Why can I not use `FN` *for* `FN$` *as a variable? Are there any other combinations I cannot use?*

Charles Gibson
Edwardsville, Illinois

The CoCo 3 manual does have some errors. You cannot use, as a variable, any name whose first two letters are the same as the first two letters of an official BASIC function such as `IF`, `ASCII`, `FN`, etc. BASIC recognizes functions by the first two letters of the function name.

Lockups in *CoCo Max 3*

My CoCo 3 locks up whenever I use the Set Colors or the Cycle Colors options in CoCo Max 3. *It also seems to have problems with other ML software. Do you have any idea what the problem is?*

Gary Hough
Stephens City, Virginia

My best guess is that you have a problem with your GIME chip. You might want to order a new one from National Parts ($25) and see if replacing the old one fixes the problem.

CoCo With a Mind of Its Own

Since I upgraded my CoCo 3 to 512K, some of the graphics screens don't work properly. When I use low-resolution `PMODE` *screens, a few pixels are set randomly even when the picture is cleared. Sometimes my computer locks up entirely or the disk drive motors turn on spontaneously. What do you think is wrong?*

Brian O'Neil
Kirkland, Washington

First I suggest downgrading to 128K to see if the problem persists. If it does, I'd say you have a damaged GIME chip and/or even a bad 68B09E. If the problem goes away, it seems the problem is due to bad DRAM on the 512K upgrade board. Test this by replacing the sixteen 256K DRAMs with new chips or by replacing, one at a time, each 256K DRAM on that board with a good DRAM.

256K-by-1 120 ns or faster DRAMs are inexpensive. Pricing is down to $2.50 or less per chip. Because I don't know the results of your test after downgrading, I assume that either you have one or more bad DRAMs on the 512K upgrade board, or there is a cold solder joint on the upgrade board. You might want to reflow all solder joints on that board. Other possibilities include a bad contact between the 512K upgrade board and the sockets on the CoCo 3, including that due to a cold solder joint between the CoCo 3 board and those 512K memory upgrade sockets. I assume, of course, that you properly installed your 512K board and cut the indicated capacitors and/or added the required resistor.

Printer Shopper

What sort of color and black-and-white printers do you recommend for the Color Computer? What kind of interface do you recommend for use with them?

Leslie Morgan
Bryant, Alabama

For most CoCo users, I recommend a low- to medium-priced 9-pin dot matrix printer. Values in the $150 to $250 price range can be found with the Panasonic KX-P1180 and KX-P1190 series of printers, as well as the Star NX-1000 printers. These printers offer decent, near-letter-quality printing, relatively fast draft print speed and a proven record of reliability. Each comes with tractors, usually push tractors that offer more flexible paper handling. Epson also sells a decent printer in this price range.

These printers support the Epson standard for graphics codes and should work with most CoCo graphics programs. The NX-1000 also comes in a color-ribbon-capable version. I advise against using a color printer unless you have a very specific application for it and have ascertained that the program you are using supports that printer. I must admit I have seen some nice results with *CoCo Max 3* and *Color Max* using color printers.

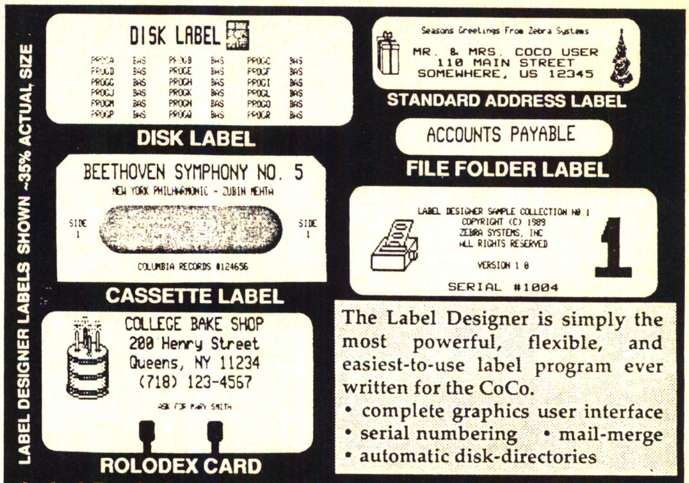
Among the more expensive 24-pin printers, I find the Panasonic KX-P1124 to be an excellent value, although the layout of its front panel controls is confusing. It sells for about $300 from mail-order outlets. 24-pin printers offer much greater speed and near-letter-quality printing. The delicate print-head, however, is more vulnerable to accidents such as snagging a pin in the ribbon and ruining the head. Replacement heads tend to cost $150 or more.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P. O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt, type `ASK` **(for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form, which has complete instructions.**

LABEL DESIGNER LABELS SHOWN ~35% ACTUAL SIZE


DISK LABEL
DISK LABEL
Seasons Greetings From Zebra Systems
MR. & MRS. COCO USER
110 MAIN STREET
SOMEWHERE, US 12345
STANDARD ADDRESS LABEL
ACCOUNTS PAYABLE
FILE FOLDER LABEL
BEETHOVEN SYMPHONY NO. 5
NEW YORK PHILHARMONIC - ZUBIN MEHTA
SIDE 1
SIDE 1
COLUMBIA RECORDS #124656
CASSETTE LABEL
LABEL DESIGNER SAMPLE COLLECTION NO 1
COPYRIGHT (C) 1989
ZEBRA SYSTEMS, INC
ALL RIGHTS RESERVED
VERSION 1 0
SERIAL #1004
1
COLLEGE BAKE SHOP
200 Henry Street
Queens, NY 11234
(718) 123-4567
ASK FOR MARY SMITH
ROLODEX CARD

The Label Designer is simply the most powerful, flexible, and easiest-to-use label program ever written for the CoCo.
- complete graphics user interface
- serial numbering
- mail-merge
- automatic disk-directories

Label Designer disk & 64 page manual $29.95
Assortment of different size and color labels.......$5.00

"I made a number of signs, cards and banners with CoCo Graphics Designer Plus and was thrilled with them all."
--Jim Issel
May 89 Rainbow

GARAGE SALE
SAT & SUN
APRIL 12-13
34 HILLTOP LANE
GREENLAWN
COMPUTER FAIR
JULY 24
GET YOUR TICKETS TODAY!
DANGER
DO NOT ENTER
NOON UNIT
THIN MUFFIN
HAPPY
GO SAILING

The CoCo Graphics Designer Plus, produces beautiful greeting cards, banners, and signs .

The CGDP features an easy-to-use point and click graphical interface with windows, scroll bars, radio buttons, and joystick or mouse control. Text can be used in up to 4 sizes and 16 fonts per page. Picture, Font, and Border collections are included. Signs and cards can be previewed on screen. ... Rave review in May 89 Rainbow (pages 110 - 113).

CGDP Disk & 64 page manual...........................$29.95

OPTIONAL PICTURE, FONT, AND BORDER DISKS: $14.95 EACH.

Picture Disk #2 4 sets of 30 pictures ea., Sports, America, Party, Office, Total 120 pictures.
Picture Disk #3 4 sets of 30 pictures ea. Animals, Nature, Religion, Travel, Total 120 pictures.
Picture Disk #4 120 Holiday Pictures: Christmas, Chanukah, Thanksgiving, New Year's, Easter, Halloween, etc.
Font Disk A 10 Fonts: Western, Stencil, Banner, Shadow, Variety, Type, Stripes, Digital, Bold3, Object
Font Disk B 10 Fonts: Arcade, Circle, Alien, Cube, Baroque, Deco, Block, Gray, Computer, Script
Border Disk #1 Contains 176 High resolution borders, great variety from simple to ornate. (The border disk is for use with the CGDP, but not with the Label Designer).

Above programs require a CoCo II 64K or CoCo III, disk drive, RSDOS, joystick or mouse. Printers supported include: Epson RX/FX/LX, Gemini 10X, SG10, NX10, NX1000, DMP105/106/110/120/130/132/133/200/400, Panasonic KXP1080 / 90 /91/92, Prowriter, C.Itoh 8510, Okidata 92/93/182/183 & more.

Ordering Instructions: All orders add $3.00 Shipping & Handling, UPS COD $3.50 additional. VISA/MC Accepted. PA residents add sales tax. Hours 9-5:45 M-F .

ZEBRA SYSTEMS, INC.
121 S. Burrowes Street
State College, PA 16801
(814) 237-2652

Name That Tune With UltiMusE

by Eddie Kuns
OS-9 SIGop

General Information (in the OS-9 SIG): Stephen Macri (DRACMAN) posted a 24-question non-computer-related quiz. An example question (not from the quiz) is: 16=O. in a P. Answer: Ounces in a pound. **Eddie Kuns** (EDDIEKUNS) submitted a 512-question "Hacker Test" to test your knowledge of obscure computer lore.

Applications: Paul Jerkatis (MITHELEN) contributed a program to generate random, syntactically correct sentences. **Kelly Thompson** (KMTHOMPSON) posted a graphics font designed for *Sokoban*.

Utilities: Tim Koonce (TIMKOONCE) released *UnTC* (including C source), a program that dearchives TC12, TC3 and TC31 archive files. **Roger Krupski** (HARDWAREHACK) contributed a group of programs to read and set a Tandy SmartWatch chip. **Bruce Isted** (OS9UGVP) posted an assembly language Line Input subroutine for BASIC09. **Ken Heist** (MKJ) submitted a program to setup an unused window. **Randy Longshore** (RANDYE) posted a collection of OS-9 utilities from the #19 NewsDisk of the European OS-9 Users Group. The utilities were written by R. J. Telkman of England. Source code is included.

Device Drivers: John Wesson (DOCBEAR) contributed a collection of additional VDG and window descriptors that use memory in the range $07FFA0 through $07FFCF. Bruce Isted released an update to The Eliminator's DACIA device driver.

Eddie Kuns is pursuing a PhD in physics at Rutgers University. He lives in Aurora, Illinois and works as a programmer and researcher at Fermilab. Eddie is co-manager of the CoCo SIG; his username is EDDIEKUNS.

Patches: John Wesson posted a patch to allow 25 or 28 row text screens and 200 or 225 row graphics screens.

Telcom: Eric Bursley (BACCHANALIAN) submitted a stand-alone program to send a true line break through the RS-232 Pak.

Graphics & Music: Glen Hathaway (COMPER) contributed a goofy little graphics program called `bounce4`. **Christian Michaud** (SUPERCHRIS) posted an erotic GIF image of a woman in a mink coat. **Mike Knudsen** (RAGTIMER) submitted the latest version of *JukeBox Player* for *UltiMusE III*. This version plays up to 32,767 notes and can filter out instrument changes. **Doug Fraser** (LDF) posted an MGE picture of the Cutty Sark, one of the last tea clippers built. **Mike Huskey** (KINGTRENT) posted a program to patch OS-9 Level I Version 2.00.00 to simulate artifact colors on an RGB monitor, and several graphics images. **Hank Walters** (COCOHAM) contributed a play file of Billy Fernando sampled from Billy Crystal's "Mahvelous!" tape. **John Kou** (BAMBOO) posted ten *UltiMusE* songs including "Up Where We Belong," "Africa," and "We've Got Tonight." **John Donaldson** (VAXELF) submitted a digitized GIF picture of a Kawasaki Ninja. **Jim Buck** (COCOROGUE) posted *Ricochet Rock*, a rock blues song for *UltiMusE III*. Jim also submitted "When the Saints go Marching In" and J.S. Bach's "Minuet." **Brian White** (BRIANWHITE) contributed the newest version of *Play*, which plays digitized sound files of up to 2 Meg. Brian also posted a fancy screen-saver program called *Maze* that creates and solves random mazes while preventing phosphor burn of your monitor. **Zack Sessions** (ZACKSESSIONS) released Larry Olsen's *PacOS9*, an arcade-style game that should be very familiar. **Mike Schneider** (MSCHNEIDER) posted a digitized sound file from the movie *Animal House*; drop and give me twenty! Kelly Thompson submitted two sound files — one was from *Batman*.

Programmers Den: Eric Stringer (NES) posted utilities to convert files from the MS-DOS world. Eric also posted the C source to a 3-D graphics plotting program. **Philip Brown** (THEFERRET) submitted a BASIC09 terminal program that supports some ANSI codes and an open invitation for anyone to continue with the project. **Greg Law** (GREGL) resubmitted Carl Kreider's C libraries, which have been archived to prevent linker errors. **Brian Wright** (POLTERGEIST) contributed an archive of C functions from UNIX systems.

CoCo SIG

General Information: Marty Goodman (MARTYGOODMAN) posted a report on the '89 Somerset RAINBOWfest.

CoCo 3 Graphics: Randy Cassel (BBTROLL) submitted a graphics collection of teenage heart-throbs, including one of Patrick Swayze. **Jason Becker** (JAYDEF) posted three digitized album covers and some natural and unnatural landscapes. **Charles Phillips** (DEORE) contributed a *Max-10* picture of a modified 1911-A1 45 automatic. Christian Michaud submitted three erotic pictures in *Color Max 3* format. **John Malon** (JOHNLM) posted a GIF picture of jet aircraft in battle. **Donald Ricketts** (STEVEPDX) contributed an MS-DOS program to view graphics files generated by the DS69B digitizer on a CGA card. **Richard Trasborg** (TRAS) and **Matthew McGinnis** (MATTMCGINNIS) were very busy uploading dozens of graphics files! Richard posted an animation of Katey Sagel in 640 format and two IMG pictures of

Christina Applegate in a bikini. Richard also submitted quite a few erotic pictures including Loni (in 16-level greyscale and color). Matt posted a number of erotic IMG files including the Budweiser gals and a collection of mythical creatures.

Utilities & Applications: Eric Parish (ERICPAR) submitted a collection of two-dimensional Turing machine programs. **Alan Bell** (ABELL5) posted a list of common PEEK, POKE and EXEC addresses for the CoCo. **Wellie Chao** (WELLIECHAO) contributed a set of programs to help you learn the periodic table of elements. **Tom Schaefer** (TASCHAEFER) submitted a patch to prevent *DynaCalc* from accessing memory above $FE00 on a CoCo 3. **Michael Kearny** (WTVD) posted the shareware version of *Home-Pac*, which includes a check register and mailing list database for the CoCo 3. **Bryan Stephens** (BRSTEPHENS) submitted a machine language program for the CoCo 3 to try different screen colors. **Roger Carlson** (PERCH) contributed a program to convert decimal numbers to fractions. **Frances Calcraft** (FRANCALCRAFT) posted a program dealing with the Rh system of blood typing and the three main systems of nomenclature. He also posted a monitor program for the CoCo 3 to examine or change any area of memory including the source. **Fred Mittermiller** (BIGFRED) contributed a program to set up the Panasonic KX-P1124's fonts and pitches. **Don Joyce** (REDCOAT) contributed a program to keep track of bowling averages. Donald Ricketts posted a patch to allow *VIP Writer III 2.0* to access *Extended ADOS-3* RAM Drives.

Hardware Hacking: John Weidman (SKYLINE) uploaded a text file explaining how to put two DOSs in one EPROM for the Disto SC-1 or SC-2 disk controllers.

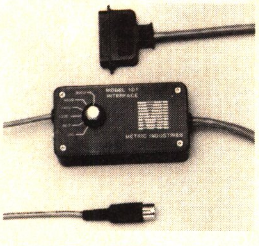
Games: Stephen Macri posted a CoCo 3 text-style football game (you play against the computer) and an Acey Ducy card game. John Malon contributed a trivia game using initials and numbers and a BASIC program for solving Rubik's Cube. Eric Stringer submitted ROBOTZAP.BAS. Can you escape the evil robots before they zap you?

Classic Graphics: Dennis McMillan (COCOKIWI) posted the Art Gallery from the March, May, July and September '89 issues of THE RAINBOW.

Music & Sound: Hank Walters contributed a sound sample of Billy Crystal. This is the same sample he posted on the OS-9 SIG.

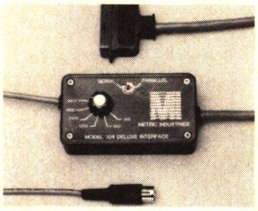
Telecommunications: Mike Ward (MIKEWARD) posted *RLETerm*, a graphics oriented terminal program. It will receive and display RLE pictures and save them to tape or disk. He also included three sample RLE pictures. **Rick Adams** (RICKADAMS) posted a program to create a login macro for *DELPHIterm* that will log you into Delphi via Telenet. ☐

METRIC INDUSTRIES, INC.



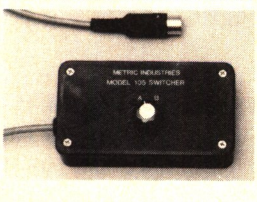
Model 101
Serial to Parallel Printer Interface

- ★ Works with any COCO
- ★ Compatible with "Centronics" Parallel Input Printers
- ★ Just turn the knob to select any one of 6 baud rates 300-9600
- ★ Comes complete with cables to connect to your printer and computer
- ★ Can be powered by most printers



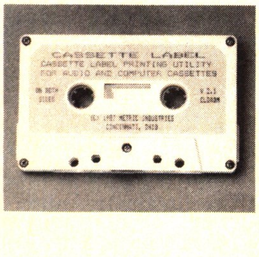
Model 104 Deluxe Interface with "Modem Switch"

- ★ **Same Features as 101 Plus**
- ★ Built in Serial Port for your Modem or other serial device
- ★ Switch between Serial Output and Parallel Output
- ★ Comes with cables to connect to your computer and printer
- ★ Can be powered by most printers



Model 105 Serial Switch

- ★ Connects to your COCO to give you 2 switch selectable Serial Ports
- ★ Comes with a 3 foot cable to connect to your computer
- ★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
- ★ Does not require power



Cassette Label Printing Program

- ★ **New Version 2.1 prints 7 lines** of information on Cassette labels
- ★ Comes on Tape with instructions to transfer to disk
- ★ Menu driven, very easy to use
- ★ **Save and Load Labels from Tape and Disk**
- ★ Uses the features of your printer to print standard, expanded, and condensed characters
- ★ **Automatically Centers Each Line of Text**
- ★ Allows editing of label before printing
- ★ Program comes with 24 labels to get you started
- ★ 16K ECB required

Some of the Printers That Can –
Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot –
Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List

Model 101	**35.95**
Model 101P	41.95
Model 104	44.95
Model 104P	51.95
Model 105	14.95
Cassette Label Program	6.95
Pin Feed Cassette Labels:	
White	3.00/100

4 Pin Din Serial COCO Cables:

Male/Male 6 foot	4.49
Male/Female 6 foot	4.49
Female/Female 6 foot	4.49
Other Lengths Available.	

All items covered by a 1 year warranty

Ordering Info

- ★ **Free Shipping** in the U.S.A. (except AK and HI) on all orders over $50
- ★ On orders under $50 please add $2.50 for shipping and handling
- ★ On orders outside the U.S.A. please write or call for shipping charges

You Can Pay By:
- ★ VISA or MasterCard
- ★ Or send check or money order payable in U.S. funds

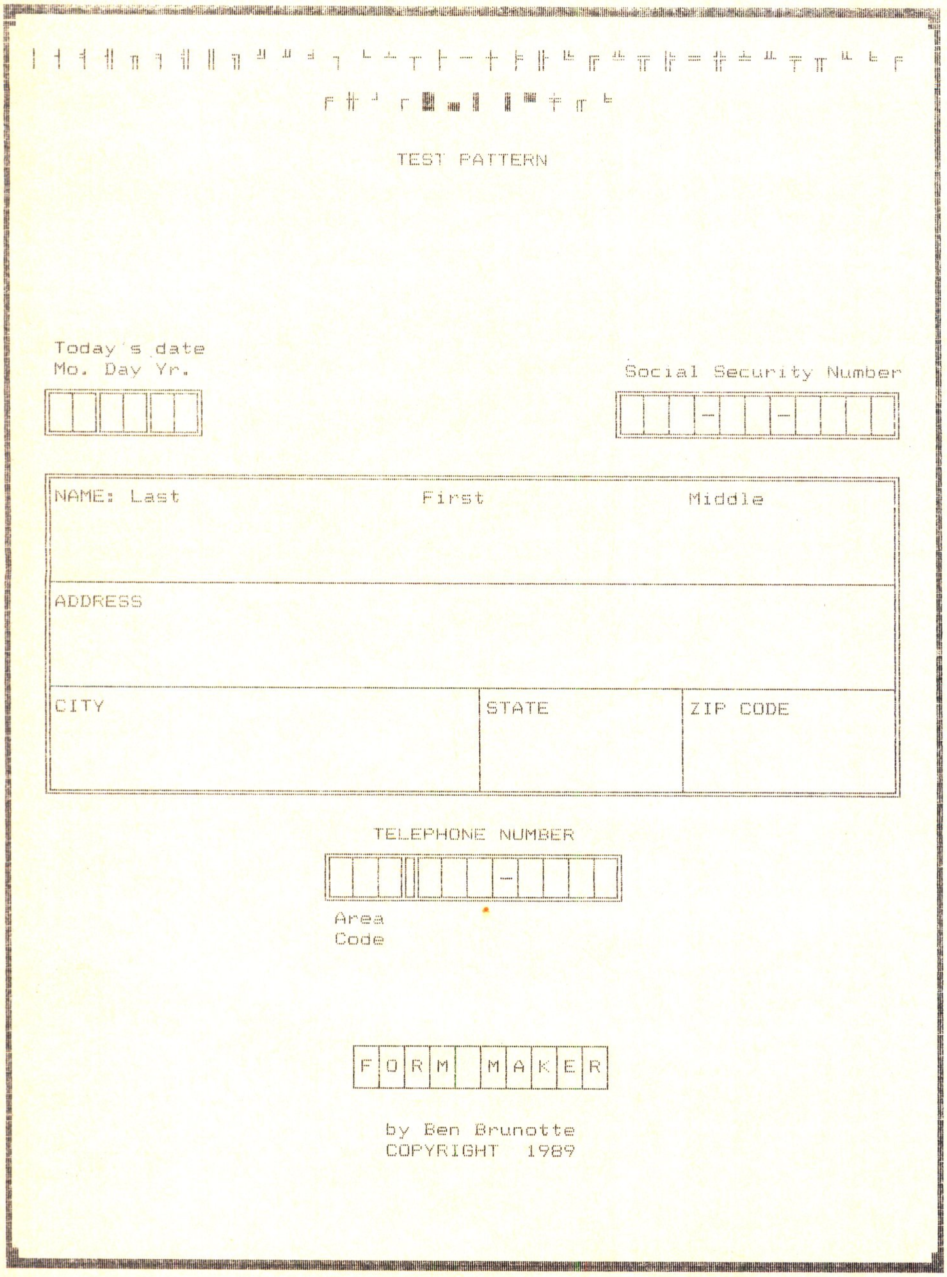
Metric Industries Inc.
P.O. Box 42396
Cincinnati, OH 45242

(513) 677-0796

A program for creating forms on IBM-compatible printers

Another Form

by Benjamin Brunotte



TEST PATTERN

Today's date
Mo. Day Yr.

Social Security Number

NAME: Last First Middle

ADDRESS

CITY

STATE

ZIP CODE

TELEPHONE NUMBER

Area
Code

FORM MAKER

by Ben Brunotte
COPYRIGHT 1989

Creating forms gets boring with a paper and pencil, so let *Form Maker* take some of the tedium out of it. The program generates forms using the IBM line characters available on IBM graphics and compatible printers. *Form Maker* requires a Color Computer 3 with one disk drive.

I used the technique for storing the line characters described in "Barden's Buffer" in the March '88 issue of THE RAINBOW. The only drawback is that changing character sets slows the program down. The printer prints the forms at normal printing speed.

Since bidirectional printing produces a wavy look, Line 860 sets the printer for unidirectional printing. This line may need to be changed to reflect control codes for the printer being used.

The control keys for the program are:

BREAK — goes to a menu to save/load on disk or to exit.

CLEAR — clears entire form to start over.

ALT — toggles the Repeat function on and off. A red cursor indicates whether or not Repeat is on. Use the arrow keys to move the cursor. When Repeat is turned on, the character under the cursor is repeated. A new character can be entered, and the new character is repeated as the cursor moves. The black cursor indicates Repeat is off.

CTRL — moves to another section of the page. The page is divided into nine overlapping sections. Use the arrow keys to select the direction of the move.

F1 — activates the line characters. Use the right and left arrow keys to scroll through the character set. Press ENTER when the character you want is displayed.

F2 — prints the form. A preview option is provided. During the preview the full width is displayed, but the page is divided into three overlapping sections for the length. Baud rate is selectable. The printer should be set to IBM-compatible mode before the program is run.

ARROW — moves the cursor on the section of the page being displayed. If the repeat is on, a character is repeated as the red cursor moves. Pressing a key on the keyboard puts that character on the form at the cursor position. The black cursor is nondestructive as it moves. ☐

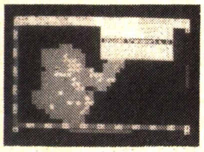
Ben Brunotte, who works in operations at a large oil refinery, is a self-taught programmer. The Color Computer is his hobby. He may be contacted at 3221 N. Twin city Hwy., #6, Nederland, TX 77627.

70	25	360	230	790	223
120	45	430	66	880	133
150	42	500	171	960	61
190	39	580	48	1080	133
210	178	600	21	1170	232
250	143	650	42	1280	154
280	189	690	175	END	28
310	250	750	60		

The Listing: FORMAKER

```
0 ' COPYRIGHT 1990 FALSOFT, INC
10 '*****************************
********
20 '*            FORM MAKER
      *
30 '*            ==========
      *
40 '*         for IBM Graphic and
      *
50 '*         compatible printers
      *
60 '*       by BENJAMIN W. BRUNOT
TE      *
70 '*            COPYRIGHT 1989
      *
80 '*****************************
********
90 GOTO170
100 HCOLOR1,4:IF Z$=" " THEN 150
110 IF Z$>" " AND Z$<="z" AND CS
=0 THEN 150 ELSE IF Z$>" " AND Z
$<="z" AND CS=1 THEN CS=0:OF=1:G
OTO 140
120 IF Z$=>CHR$(179) AND Z$<=CHR
$(223) AND CS=1 THEN 150 ELSE IF
 Z$=>CHR$(179) AND Z$<=CHR$(223)
 AND CS=0 THEN CS=1:OF=46:GOTO 1
40
130 HSCREEN0:CLS5:LOCATE0,11:PRI
NT"CHARACTER ERROR !!!!":PRINT"
 CHARACTER #";STR$(ASC(Z$)):STOP
140 FOR L=0 TO 44:FOR B=0 TO 7:N
=ASC(MID$(CS$(L+OF),B+1,1)):POKE
 (61605+(L*8)+B),N:NEXT B,L
150 IF Z$=>" " AND Z$<="z" THEN
HPRINT(CL-XO,RW-YO),Z$ ELSE HPRI
NT(CL-XO,RW-YO),CHR$(ASC(Z$)-146
)
160 RETURN
170 POKE 65497,0:PALETTE0,63:PAL
ETTE1,0:PALETTE2,63:PALETTE3,36
180 WIDTH40:CLS5:CLEAR7000:DIM L
T$(66),CS$(90):VERIFYON:HBUFF1,1
6:ON BRK GOTO 580:LOCATE0,7:PRIN
T"  ";STRING$(36,"*"):PRINT"  *"
;STRING$(12,32);"FORM MAKER";STR
ING$(12,32);"*"
190 PRINT"  *";STRING$(12,32);"=
=========";STRING$(12,32);"*":PR
INT"  *";STRING$(8,32);"for IBM
Graphic and";STRING$(7,32);"*":P
RINT"  *";STRING$(8,32);"compati
ble printers";STRING$(7,32);"*"
200 PRINT"  *      by BENJAMIN W
. BRUNOTTE     *":PRINT"  *";STR
ING$(10,32);"COPYRIGHT 1989";STR
ING$(10,32);"*":PRINT"  ";STRING
$(36,"*"):LOCATE0,0
210 FOR L=1 TO 90:CS$(L)="":NEXT
 L:FOR L=0 TO 44:FOR B=0 TO 7:N=
PEEK(61605+(L*8)+B):CS$(L+1)=CS$
(L+1)+CHR$(N):READ N:CS$(L+46)=C
```

Overlord

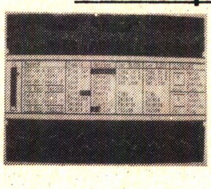


Peace through superior firepower is the catch phrase in this sophisticated wargame simulator. Victory shall not fall to he who is the mightiest, oh no, but to he who can plan ahead and develop the better strategy. You must ensure that all your troops are brought into battle at the right moment, and for that you must set your most industrialized cities to producing troop transporters. Other cities will build Aircraft carriers, fighter jets, paratroop regiments, submarines, spy planes, battleships, destroyers, and cruisers. Up to three people can play the game simultaneously, each starting out at his own base city, each knowing nothing about the strenghts and locations of his enemies' forces. The player's own combat troops will head out, exploring the world as they go, capturing towns that lie waiting, or engaging the enemy face to face. You can set any or all of the three players to be operated by the sinister silicon brain of your CoCo 3, and battle them or let them battle each other.

Price: $29 US / $34 Cdn. (Now shipping v1.1)

Overlord requires: 128k CoCo 3, 1 drive and a mouse or joystick.

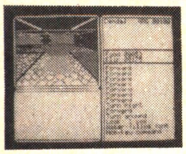
Studio Works Professional:
Studio quality digital audio is here! New!



NEW!

A new hardware pack developed by Oblique Triad allows our new software to record at 35kHz at eight bits wide! Your CoCo3 is now a serious, professional quality digital sampling system. The optional MIDI slave mode (cable required) lets you 'play' your CoCo from your MIDI computer or synthesizer. The built-in rigid tempo sequencer will let you lay down a useful, studio quality rythym section. New 'scale' feature lets you play any of up to 55 (512k) sounds effects directly from CoCo's keyboard, one on each row, low to high from left to right. Two zoom windows allow for perfect loop setting down to the byte. Support for Disto/CRC's 1 meg RAM card, our 8-bit output option (built into the pack), Orchestra 90CC, hires mouse. 25 seconds of CD-quality in 1 Meg! Point-and-click operation, clipboards, too many features to list! (Call for SWPro FX discs!)

Price: $95 US/$110 CDN (incl. software, demo samples, ADC pack)
(Call for prices on 8-bit output, MIDI cable, SW Pro with just cable)
Req.: 128k Coco3, (512k rec'd), multi-pak/Y-cable, mouse/joystick



the Seventh Link

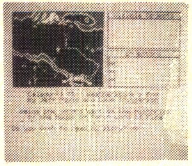
The Seventh Link is still the best fantasy role-playing adventure the CoCo has ever seen, bar none. 3 discs are filled with worlds, towns castles, and spectacular 3D dungeons filled with full colour, hi-res monsters, ladders, doors and pits, chests, pools, lava and flooded rooms. You would not believe that a CoCo 3 could produce such high-speed detailed graphics. In the wild lands above, you'll find monsters, towns and castles. The towns will reveal merchants, learned locals, even friends who will join your quest. Look no further for the best in hard-core adventure.

$38 US/ $48 Cdn. Req: CoCo3, 40 track drive

Caladuril II:
Weatherstone's End

"Some of the best graphics to be seen on a CoCo 3" will amaze you as you attempt to discover the fate of the Weatherstone. Smooth scrolling 16 colour graphics and a sophisticated command interpreter lend realism and enjoyment to one of the most extensive adventures to be found on a CoCo. Package includes 2 discs, an 11x17" map, a velvet pouch of powerstones and a 20 page booklet.

Price: $32 US/ $38 Cdn
(Caladuril 1: $18/$24, CoCo2, drive)



Requires: 128k CoCo 3, 1 drive.

Hint Books!
Caladuril 1 and 2 books :20 pp, $3.50. Seventh Link books are 40 pages, $5.50

Those Darn Marbles

Dedicate a program to 512k machines only, and all sorts of new things are possible. Those darn Marbles is the first CoCo game to use the built-in hardware screen scrolling features of the CoCo 3. This means that all the computer's time cn be dedicated to controlling the game itself (sound effects, moving objects around, etcetera) rather than the time-intensive chore of scrolling an entire 32k screen around. You will be amazed to see how smoothly a HARDWARE-scrolled screen can move. Compare Those Darn Marbles with any other 3D marble type game on any computer, and you will be convinced that your CoCo 3 really can stand with the best of them. (One of our playtesters remarked, upon seeing the pre-release version of TDM: "My Amiga isn't that smooth!") 50k of multi-tasking sound, nearly 1 meg of graphics add excitement!

Our new 2-stage compression routine squeezes 1.1M onto 4 discs!

It's been said many times, but this time it's true: Your CoCo 3 game library is not complete without a copy of Those Darn Marbles. Your 512k CoCo 3 never looked so good!

New!

Price $32 US / $38 Cdn. Requires: 512k CoCo 3,1 drive,joystick.

Come and see us at Rainbowfest Chicago!

Oblique Triad

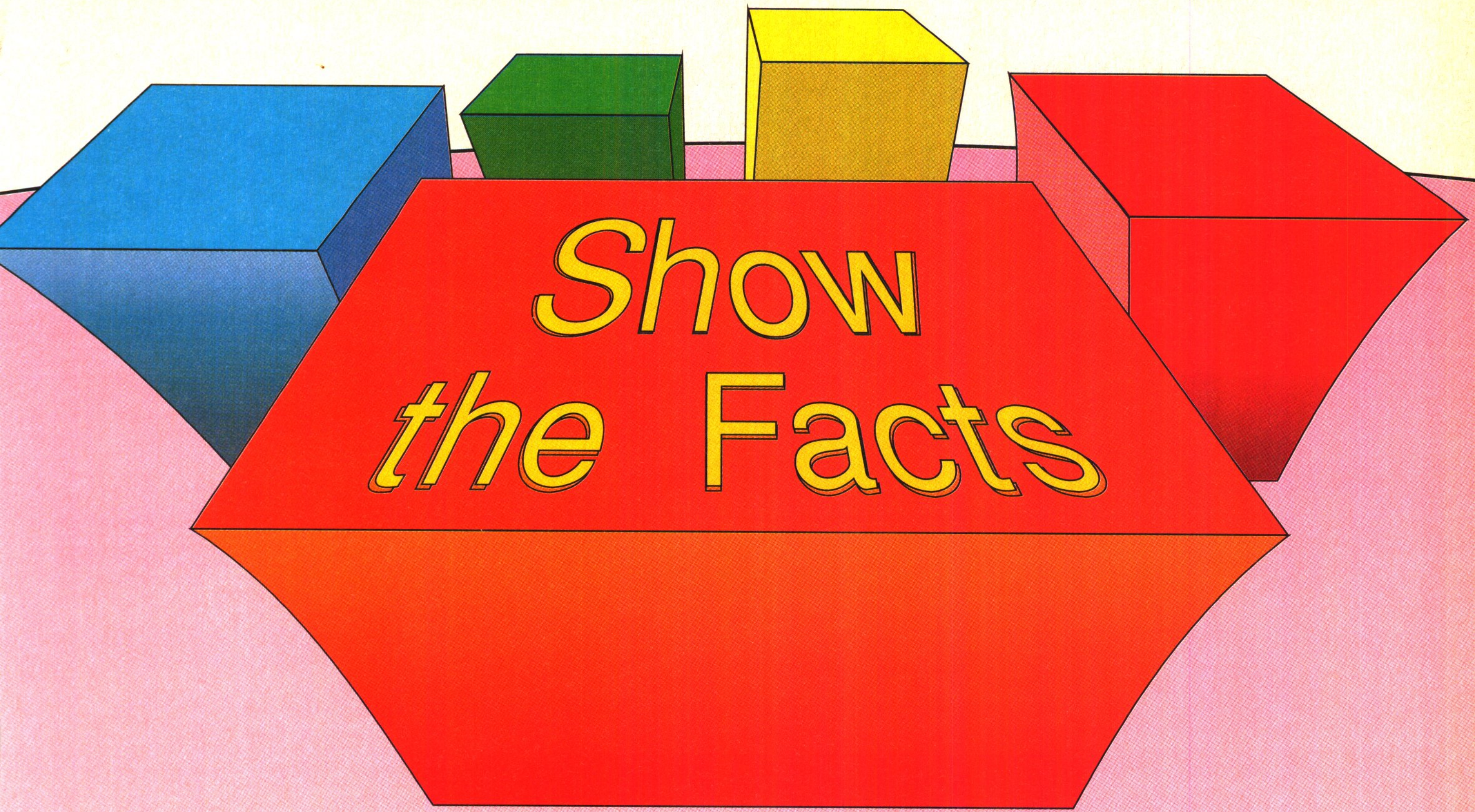
32 Church St., Georgetown, Ontario, CANADA, L7G 2A7
(416) 877-8149

We accept: MasterCard, Amex, Personal cheques and Money Orders.
COD in Canada only. Please add $2.50 shipping to all software orders, $1 to all book-only orders. Ontario residents please add 8% tax.
Call or write for a free catalogue.

```
S$(L+46)+CHR$(N):NEXT B,L
220 HCOLOR1,4:HSCREEN1:HGET(0,0)
-(7,7),1
230 HCOLOR1,4:HSCREEN1:XO=1:YO=1
:DP=0:FOR B=1 TO 66:LT$(B)=STRIN
G$(80,32):NEXT B:X=0:Y=0:Z$=" ":
GOTO 250
240 HCOLOR1,4:HSCREEN1:FOR RW=YO
 TO YO+23:FOR CL=XO TO XO+39:Z$=
MID$(LT$(RW),CL,1):GOSUB 100:NEX
T CL,RW:X=0:Y=0:DP=0
250 SOUND255,1:NX=0:NY=0:XX=X*8:
YY=Y*8:IF DP=1 THEN PALETTE3,36:
HPUT(XX,YY)-(XX+7,YY+7),1,NOT EL
SE PALETTE3,0:HPUT(XX,YY)-(XX+7,
YY+7),1,NOT
260 IF PEEK(341)=191 THEN IK$=IN
KEY$:SOUND110,5:IF DP=0 THEN DP=
1:Z$=MID$(LT$(YO+Y),XO+X,1):GOTO
510 ELSE DP=0:GOTO510
270 IF PEEK(342)<>191 THEN 330
280 HSCREEN0:CLS5:PRINT"PRESS AN
 ARROW KEY TO MOVE TO ANOTHER":P
RINT"SECTION OF THE FORM OR":PRI
NT"PRESS <ENTER> TO STAY IN SAME
 SECTION"
290 IK$=INKEY$:IF IK$=CHR$(13) T
HEN 240
300 IF IK$=CHR$(8) THEN XO=XO-20
 ELSE IF IK$=CHR$(9) THEN XO=XO+
20 ELSE IF IK$=CHR$(10) THEN YO=
YO+21 ELSE IF IK$=CHR$(94) THEN
YO=YO-21 ELSE 290
310 IF XO<1 THEN XO=1 ELSE IF XO
>41 THEN XO=41 ELSE IF YO<1 THEN
 YO=1 ELSE IF YO>43 THEN YO=43
320 GOTO 240
330 IF PEEK(343)<>191 THEN 390 E
LSE Z=179
340 HCOLOR1,4:HPUT(XX,YY)-(XX+7,
YY+7),1,PSET:Z$=CHR$(Z):CL=XO+X:
RW=YO+Y:GOSUB100
350 IF INKEY$=CHR$(13) THEN 380
ELSE IF PEEK(343)=247 THEN Z=Z-1
 ELSE IF PEEK(344)=247 THEN Z=Z+
1 ELSE 350
360 IF Z<179 THEN Z=223 ELSE IF
Z>223 THEN Z=179
370 GOTO 340
380 Z$=CHR$(Z):GOTO 490
390 IF PEEK(344)=191 THEN HCOLOR
1,4:GOTO 670
400 IF PEEK(343)=247 THEN NX=-1
ELSE IF PEEK(344)=247 THEN NX=1
ELSE IF PEEK(342)=247 THEN NY=1
ELSE IF PEEK(341)=247 THEN NY=-1
410 IF NX<>0 OR NY<>0 THEN 510
420 IK$=INKEY$:IF IK$="" THEN 26
0
430 IF IK$="g" AND PEEK(343)=191
 THEN 330
440 IF (IK$="@" AND PEEK(341)=19
1) OR IK$="^" THEN 260
450 IF IK$<>CHR$(12) THEN 480
460 HSCREEN0:CLS5:PRINT"DO YOU W
ANT TO CLEAR FORM (Y/N)?"
470 IK$=INKEY$:IF IK$="Y" OR IK$
="y" THEN 230 ELSE IF IK$="N" OR
 IK$="N" THEN 240 ELSE 470
480 IF IK$<" " OR IK$>"z" THEN 2
60 ELSE Z$=IK$
490 IF DP=0 THEN NX=1
500 MID$(LT$(YO+Y),XO+X,1)=Z$
510 HPUT(XX,YY)-(XX+7,YY+7),1,PS
ET:CL=XO+X:RW=YO+Y:GOSUB 100:X=X
+NX:Y=Y+NY
520 IF X<0 THEN X=39:Y=Y-1
530 IF X>39 THEN X=0:Y=Y+1
540 IF Y<0 THEN Y=23
550 IF Y>23 THEN Y=0
560 IF DP=1 THEN MID$(LT$(YO+Y),
XO+X,1)=Z$ ELSE Z$=MID$(LT$(YO+Y
),XO+X,1)
570 CL=XO+X:RW=YO+Y:GOSUB100:GOT
O250
580 HCOLOR1,4:HSCREEN0:CLS5:PRIN
T:PRINT" S = SAVE TO DISK":PRINT
" L = LOAD FROM DISK":PRINT" R =
 RETURN TO SAME FORM":PRINT" N =
 START NEW FORM":PRINT" X = EXIT
 FROM PROGRAM":PRINT:PRINT"PRESS
 S, L, R, N, OR X KEY.";
590 IK$=INKEY$:IF IK$="R" OR IK$
="r" THEN POKE 65497,0:GOTO 240
ELSE IF IK$="N" OR IK$="n" THEN
POKE 65497,0:GOTO230 ELSE IF IK$
="X" OR IK$="x" THEN POKE 65496,
0:PALETTE CMP:CLEAR 500:PRINT:PR
INT:PRINT" GOODBYE":END
600 IF IK$<>"S" AND IK$<>"L" AND
 IK$<>"s" AND IK$<>"l" THEN 590
ELSE CLS
610 PRINT:PRINT"ENTER FILENAME:
";:LINEINPUT F$:IF LEN(F$)>8 THE
N PRINT"  TOO LONG - REDO":GOTO6
10
620 POKE 65496,0:F$=F$+"/FMI":OP
EN"D",#1,F$,1:FIELD#1,1 AS A$:R=
1:IF IK$="L" OR IK$="l" THEN 650
630 PRINT"SAVING ";F$:FOR B=1 TO
 66:LOCATE0,4:PRINT"LINE";B
640 FOR I=1 TO 80:LSET A$=MID$(L
T$(B),I,1):PUT#1,R:R=R+1:NEXT I,
B:CLOSE:GOTO580
650 PRINT"LOADING ";F$:FOR B=1 T
O 66:LOCATE0,4:PRINT"LINE";B
660 FOR I=1 TO 80:GET#1,R:R=R+1:
MID$(LT$(B),I,1)=A$:NEXT I,B:CLO
SE:XO=1:YO=1:DO=0:POKE 65497,0:G
OTO240
670 HCOLOR1,4:HSCREEN0:CLS5:PRIN
T:PRINT"DO YOU WANT TO PREVIEW F
ORM (Y/N)?"
680 IK$=INKEY$:IF IK$="N" OR IK$
="n" THEN 750 ELSE IF IK$<>"Y" A
ND IK$<>"y" THEN 680
690 PRINT:PRINT"PRESS <ENTER> TO
 CONTINUE AFTER EACH       SECTIO
N OF THE FORM.":FOR B=1 TO 250*5
:NEXTB
700 XO=1:FOR YO=1 TO 43 STEP21:H
SCREEN4
710 FOR Y=0 TO 23:RW=YO+Y:IF LT$
(RW)=STRING$(80,32) THEN 730
720 FOR X=0 TO 79:CL=XO+X:Z$=MID
$(LT$(RW),CL,1):GOSUB100:NEXTX
730 NEXTY:SOUND10,5:SOUND150,3
740 IK$=INKEY$:IF IK$<>CHR$(13)
THEN 740 ELSE NEXT YO
750 HSCREEN0:CLS5:PRINT:PRINT"PR
INT FORM (Y/N)?";:XO=1:YO=1:DP=0
760 IK$=INKEY$:IF IK$="N" OR IK$
="n" THEN 240 ELSE IF IK$<>"Y" A
ND IK$<>"y" THEN 760
770 CLS5:PRINT:PRINT"READY PRINT
ER AND SELECT BAUD RATE:":PRINT"
    1)  300 BAUD":PRINT"    2)
600 BAUD":PRINT"    3) 1200 BAUD
":PRINT"    4) 2400 BAUD":PRINT"
    5) 4800 BAUD":PRINT"    6) 9
600 BAUD"
780 IK$=INKEY$:IF IK$<"1" OR IK$
>"6" THEN 780
790 POKE 65496,0:ON VAL(IK$) GOT
O 800,810,820,830,840,850
800 POKE150,180:GOTO860
810 POKE150,87:GOTO860
820 POKE150,41:GOTO860
830 POKE150,18:GOTO860
840 POKE150,7:GOTO860
850 POKE150,1
860 PRINT#-2,CHR$(27);"U1";:'UNI
DIRECTIONAL PRINTING
870 FOR B=1 TO 66:PRINT"PRINTING
 LINE";B
880 IF LT$(B)=STRING$(80,32) THE
N PRINT#-2,CHR$(13); ELSE PRINT#
-2,LT$(B)
890 NEXTB:GOTO580
900 DATA 24,24,24,24,24,24,24,24
910 DATA 24,24,24,24,248,24,24,2
4
920 DATA 24,24,248,24,248,24,24,
24
930 DATA 54,54,54,54,246,54,54,5
4
940 DATA 0,0,0,0,254,54,54,54
950 DATA 0,0,248,24,248,24,24,24
960 DATA 54,54,246,6,246,54,54,5
4
970 DATA 54,54,54,54,54,54,54,54
980 DATA 0,0,254,6,246,54,54,54
990 DATA 54,54,246,6,254,0,0,0
1000 DATA 54,54,54,54,254,0,0,0
1010 DATA 24,24,248,24,248,0,0,0
1020 DATA 0,0,0,0,248,24,24,24
1030 DATA 24,24,24,24,31,0,0,0
1040 DATA 24,24,24,24,255,0,0,0
1050 DATA 0,0,0,0,255,24,24,24
1060 DATA 24,24,24,24,31,24,24,2
4
1070 DATA 0,0,0,0,255,0,0,0
1080 DATA 24,24,24,24,255,24,24,
24
1090 DATA 24,24,31,24,31,24,24,2
4
1100 DATA 54,54,54,54,55,54,54,5
4
1110 DATA 54,54,55,48,63,0,0,0
1120 DATA 0,0,63,48,55,54,54,54
1130 DATA 54,54,247,0,255,0,0,0
1140 DATA 0,0,255,0,247,54,54,54
1150 DATA 54,54,55,48,55,54,54,5
4
1160 DATA 0,0,255,0,255,0,0,0
1170 DATA 54,54,247,0,247,54,54,
54
1180 DATA 24,24,255,0,255,0,0,0
1190 DATA 54,54,54,54,255,0,0,0
1200 DATA 0,0,255,0,255,24,24,24
1210 DATA 0,0,0,0,255,54,54,54
1220 DATA 54,54,54,54,63,0,0,0
1230 DATA 24,24,31,24,31,0,0,0
1240 DATA 0,0,31,24,31,24,24,24
1250 DATA 0,0,0,0,63,54,54,54
1260 DATA 54,54,54,54,255,54,54,
54
1270 DATA 24,24,255,24,255,24,24
,24
1280 DATA 24,24,24,24,248,0,0,0
1290 DATA 0,0,0,0,31,24,24,24
1300 DATA 255,255,255,255,255,25
5,255,255
1310 DATA 0,0,0,0,255,255,255,25
5
1320 DATA 240,240,240,240,240,24
0,240,240
1330 DATA 15,15,15,15,15,15,15,1
5
1340 DATA 255,255,255,255,0,0,0,
0
```

A 3D bar graph program for charting information

Show the Facts



by Bryan Stephens

Business tools come in all shapes and sizes, and the ability to view financial data in graphics form is a tool few businesses can do without. The three-dimensional bar graph program *3DGraph* is one in which up to 52 bars can be plotted. The width of the bars varies in size according to the total number of bars created. The program includes an option that expands the graph, giving it greater resolution; this too depends upon the variables. Also provided is a means to print the graph on your printer.

Operation *of 3DGraph* is straightforward. It does three things:

Plots up to 52 points -- type a number and then press ENTER to go on to the next number. When finished, enter **-1**. The program then transfers control to the plotting routine. There is an automatic cut-off point at 52 bars.

Expands the graph -- the results you get depend upon the numbers plotted, but the lowest number is reconfigured to 0 with the others scaled appropriately.

Prints out either or both graphs (as in the sample printout). You will need a printer with graphics capabilities. If you have a Radio Shack DMP (I have a DMP-130), there should be no errors. For those of you with other printers, the codes used are in the following lines:

102 -- tells the printer to repeat the subsequent **CHR$** code six times.
104 -- **CHR$(18)** sets the Graphics mode, **CHR$(30)** resets the printer for WP mode, and **CHR$(20)** tells the printer to use the Condensed mode.
106 -- positions the print head to a particular column.
108 -- the line feed code. In this case the linefeed is set to equal $^{1}/_{216}$ inch.

Programming Notes

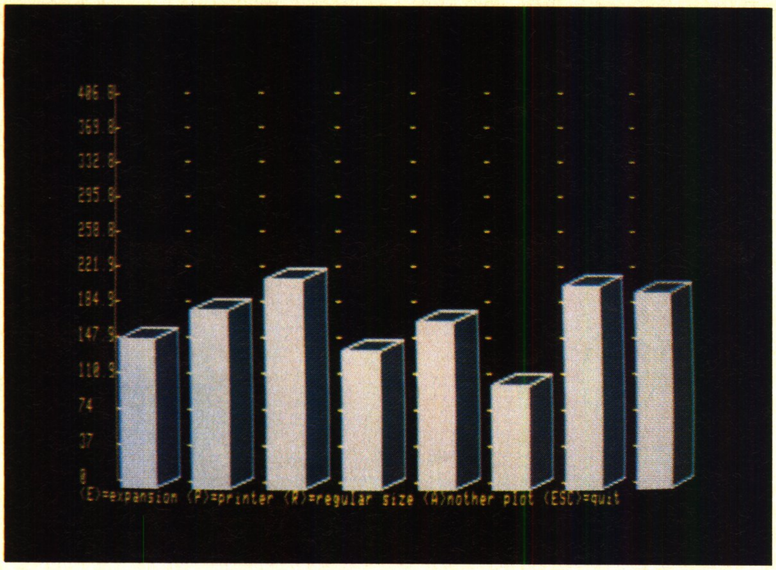
Line 100 contains the slow-down poke and sets the baud rate (the speed at which the computer sends data to the printer). In this program 18 (2400 baud) is used, but if the high-speed poke is left set, just divide the baud rate in half, i.e., 40 (1200 baud). Further information on baud rates can be found on Page 24 in the April 1987 issue of THE RAINBOW.

Lines 110 through 114 contain an error trap to see if the printer is online and also a routine to change screens and return without clearing the **HSCREEN** (taken from Page 52 in the May 1987 issue of THE RAINBOW).

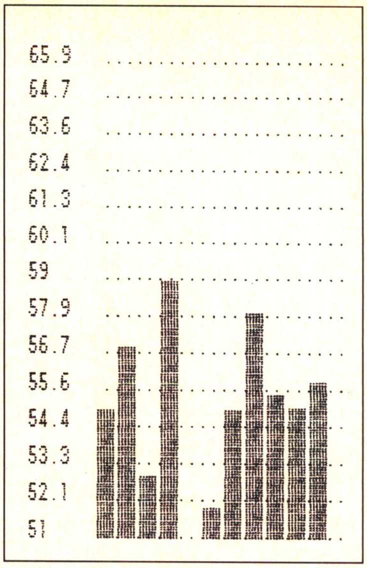
Hardware Needed

This program was designed using a CoCo 3, a CM-8 monitor, a DMP-130 printer and a disk drive. You'll need everything but the disk drive to run *3DGraph*. The program can be adapted for other CoCos using **PMODE4** graphics, but the number of bars will be reduced.

Bryan Stephens lives on the west coast of Canada. Working as a self-employed handyman gives him time to pursue his interest in computers. He has been working with the CoCo 3 for three years. He may be contacted at 43140 Government Road, Apt. 303, Brackendale, B.C., V0N 1H0 Canada.



```
<E>=expansion <P>=printer <R>=regular size <A>nother plot <ESC>=quit
```



CoCo 3

16	0
30	210
52	189
70	157
82	160
98	41
114	121
124	228
136	179
END	49

The Listing: 3DGRAPH

```
0 ‘ COPYRIGHT 1990 FALSOFT, INC
2 CLEAR7000
4 DIM P(52),V$(13)
6 ON BRK GOTO144
8 RGB:WIDTH40:CLS4:ATTR3,3
10 PRINT”This is 3-D Graphing pr
ogram. There are three main opti
ons to it.”
12 PRINT:PRINT”1)Regular size gr
aph”:PRINT”2)Expanded scale grap
h”
14 PRINT”3)Printing of either ty
pe of graph”
16 PRINT:PRINT”**Note that you c
an plot from 1-31      points (r
ange=0 to 99999) use -1 to end”
18 A=1
20 LOCATE0,15:PRINT”Enter  numbe
r “:LOCATE13,15:PRINTA:LOCATE16,
15:PRINT”to plot”;:INPUT P(A):LO
CATE24,15:PRINT”          “
22 IF P(A)<0AND A=1THEN20
24 IF P(A)=-1 THEN A=A-1:GOTO30
26 IF P(A)>99999 OR P(A)<0THEN 2
0
28 A=A+1:IF A>52THEN A=A-1:GOTO3
0ELSE20
30 ‘**** INITIALIZING ****
32 SM=P(1):LG=P(1):FOR Q=1TO A:I
F P(Q)>LG THEN LG=P(Q)
34 IF P(Q)<SM THEN SM=P(Q)
36 NEXT:Q=Q-1:FL=1
38 EX=0:Z=-2:IF LG=0THEN RUN
40 Y2=(53-Q)*2:SC=(180-Y2)/LG:PC
=(182-Y2)/LG
42 G=(295/Q)*2:G2=G/2
44 ‘**** SET SCREEN ****
46 HSCREEN4:HCOLOR1:PALETTE3,63:
PALETTE2,3:PALETTE0,0
48 ON BRK GOTO 144
50 POKE65497,0
52 HLINE(40,0)-(40,180),PSET
54 FOR L=180 TO 0 STEP-16
56 V=(180-L)/SC+EX:IF V<1000THEN
 V=INT(V/.1+.5)*.1ELSE V=INT(V+.
5)
58 V$=STR$(V):U=LEN(V$):V$=RIGHT
$(V$,U-1):A=A+1
60 HPRINT(0,L/8),V$
62 FOR B=44TO630STEP G:HLINE(B-4
,L)-(B,L),PSET:NEXT
64 NEXT
66 HPRINT(0,23),”<E>=expansion <
P>=printer <R>=regular size <A>n
other plot <ESC>=quit”
68 ‘**** PLOT BARS ****
70 A=1
72 FOR X=44TO630STEP G:Y=INT(180
-P(A)*SC+.5):HCOLOR3
74 IF X>630THEN88
76 HLINE(X,183)-(X+G2,Y),PSET,BF
78 HLINE(X,Y)-(X+G2*.66,Y-G2*.13
),PSET:HLINE(X+G2,Y)-(X+G2+G2*.6
6,Y-G2*.13),PSET:HLINE(X+G2,183)
-(X+G2+G2*.66,183-G2*.13),PSET’/
//lines
80 HLINE(X+G2*.66,Y-G2*.13)-(X+G
2+G2*.66,Y-G2*.13),PSET:HLINE(X+
G2+G2*.66,183-G2*.13)-(X+G2+G2*.
66,Y-G2*.13),PSET
82 HPAINT(X+G2,Y-1),2,3
84 HPAINT(X+G2+1,181),2,3
86 A=A+1:NEXT
88 A$=INKEY$:IF A$=”P”THEN98ELSE
 IF A$=”R”THEN96ELSE IF A$=”A”TH
EN HSCREEN0:RUN
90 IF A$<>”E”THEN88
92 IF FL=2THEN88ELSE HCLS:FOR A=
1TO Q:P(A)=P(A)-SM:NEXT:LG=LG-SM
:EX=SM:IF LG=0THEN LG=1
94 FL=2:GOTO40
96 IF FL=1THEN88ELSE FOR A=1TO Q
:P(A)=P(A)+SM:NEXT:LG=LG+SM:FL=1
:GOTO38
98 ‘**** PRINTER ROUTINE ****
100 POKE65496,0:POKE150,18
102 R$=CHR$(28)+CHR$(6)
104 G$=CHR$(18):N$=CHR$(30)+CHR$
(27)+CHR$(20)
106 P$=CHR$(27)+CHR$(16)
108 LF$=CHR$(27)+CHR$(51)
110 SP=PEEK(65314)AND1
112 IF SP>0THEN PLAY”V2;L100;C”:
POKE &HE6E4,&HE6:HSCREEN0:POKE &
HE6E4,&HE7:WIDTH40:ATTR2,3:PRINT
“TURN THE PRINTER ON !!!”:GOTO11
0ELSE116
114 A$=””:POKE &HE6E4,&HE6:HSCRE
EN4:POKE &HE6E4,&HE7
116 D=0:FOR A=182TO0STEP-14:V=(1
82-A)/PC:IF V<100THEN V=INT(V/.1
+.5)*.1ELSE V=INT(V+.5)
118 V$=STR$(V+EX):U=LEN(V$):V$(D
)=RIGHT$(V$,U-1):D=D+1:NEXT
120 D=14:FOR A=0TO26
122 IF A/2=INT(A/2)THEN D=D-1:PR
INT#Z,N$;:PRINT#Z,USING”%     %”
;V$(D);:PRINT#Z,STRING$(Q*2+1,”.
“);
124 T=1:FOR J=45TO(Q*14+35)STEP1
4
126 IF J>255THEN F1=INT(J/256):F
=J+1-F1*256ELSE F1=0:F=J
128 YY=INT(182-P(T)*PC+.5):IF A*
7<YY OR YY>181THEN NN=0:GOTO138
130 IF A*7=YY THEN NN=128:GOTO13
6
132 IF A*7>YY+7 THEN NN=255:GOTO
136
134 NN=0:D2=7-(A*7-YY):FOR K=D2
TO 6:NN=NN+INT(2^K):NEXT:NN=NN+1
28
136 PRINT#Z,N$;P$;CHR$(F1);CHR$(
F);G$;R$;CHR$(NN);
138 T=T+1:NEXT:PRINT#Z,G$;LF$
140 T=0:NEXT
142 POKE65497,0:GOTO88
144 HSCREEN0:RGB:WIDTH40:POKE654
96,0:END
```

NEW!

Window Writer 1.2

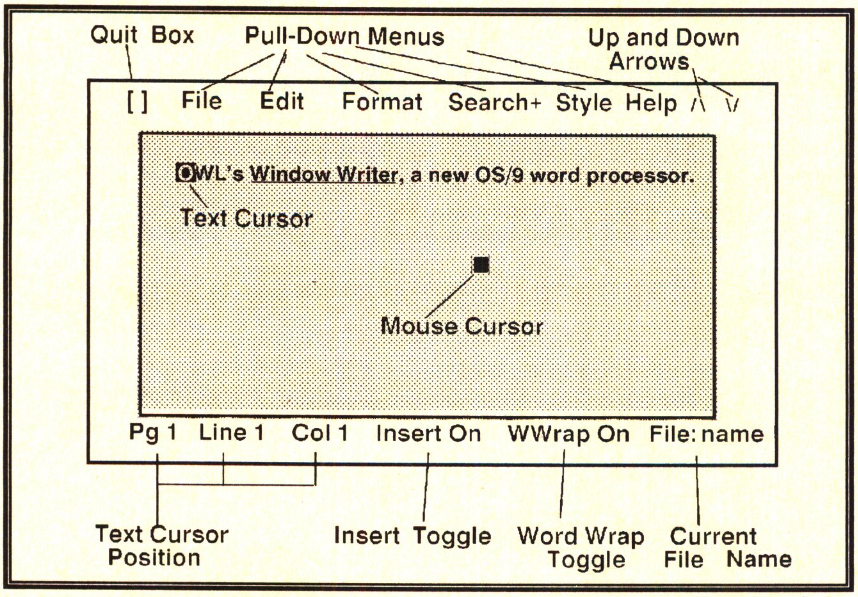
What we believe to be the best word processor available for OS/9 just got better! You asked and we listened. We have added new features which the public has requested!

DYNASPELL 102K WORD SPELLING CHECKER NOW AVAILABLE!

More Versatile and Powerful. OS/9 Allows you Freedom and Power. The mouse and pull-down menus give you speed and ease of use.

Multi-Tasks

Window Writer is the first Color Computer word processor which takes full advantage of OS/9. The result is a word processor which is fully as modern and professional in action as those previously available only for the IBM and Mac. The operating system allows true multi-tasking with other programs or itself. Not limited to just printing one file and editing another. You can print one file in one window while you edit files in other windows. At the same time you can be running a small program in another window. You can cut and paste between sections of files in different windows.



Pull Down Menus and Help Screens

A full selection of pull down menus and detailed help screens make learning easy and are only a key stroke (or mouse click) away. All menus and help screens can be user configured for everything including menu colors and contents. You don't like the color of a menu? You think one help item should be listed differently? Change them!

The menus and help screens can be reached by cursor keys or the mouse (or joystick) or can be accessed by control keys.

Hi-Res Display

Window Writer uses an **80-column monitor display** screen for clarity. As shown in the above screen drawing, you can quickly see how to access the menus and help screens. You can determine the current position by page, line number, and column. The mouse can use this section to quickly change to a specific page or line in the file. The text insert and word wrap toggles also are indicated and changeable with the mouse button.

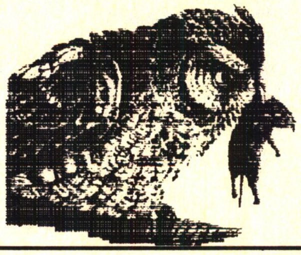
Ram Disk

A RAM disk is set up in **Window Writer** to make full use of all or a user specified portion of the memory on the 512K CoCo 3. On the 128K CoCo a smaller RAM disk is set up to still allow use of all available memory for file editing. For use of all features, a 512K machine is required.

The RAM disk is used for storage of the file(s) being edited, for the clipboard for cut and paste, and as a print spooler for the file being printed. **Window Writer's** clipboard can be saved to disk or pasted into any file being edited because files use the same clipboard memory. The RAM disk also can be used with other OS/9 programs.

Mail-Merge

With **Window Writer** you can create form letters and send them out to a list of addresses in an address file. First names or other information can be added to "personalize" these letters.



French Version:

An abridged French translation of the **Window Writer** manual is now available. This manual is written by a Canadian CoCo user and will aid French speaking users. **Only $7.50 additional.**

Editing is a snap with OWL's Efficient Mouse Usage!

Editing

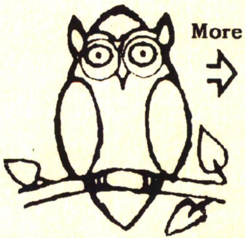
Like most modern word processors, with **Window Writer** there is always more than one way to access any editing feature. You can access editing by menus using mouse, "keyboard mouse", or through control keys. Full help screens are quickly available for all editing features. A help screen can be left visible while needed and then quickly removed to get back to full screen editing.

One nice feature is the price:

only $59.

For the DynaSpell Spelling Checker by Dale Puckett including the 102K Word Dictionary:

only $20. additional!



More ⇒

OWL-WARE

P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

OWL-WARE

Proven

On the Razor's Edge of

The Hard Drive's New Frontier:

The Most Advanced Color Computer Hard Drive System Ever Offered!

Fast No-Halt SCSI Floppies Using Optional SCSI Controller

Proven Performance for Demanding Home or Business Users

OWL-WARE has now been supplying Color Computer hard drive systems for over 4 years. We have reached our position in the hard drive market by providing our customers with a high quality product that they can be proud to own and use. Our first concern has always been quality and sound design.

We are now announcing our most advanced hard drive system ever. **Using the optional OMTI 5200 SCSI controller with our Hard Drive Interface, our new system will support no-halt floppy drives.** You need not wait while typing or worry about clock time losses. Why be limited to 3 floppy drives? A complete system could now consist of 1-3 standard CoCo floppy drives, 1-2 (or more) hard drives, and 1-2 no-halt floppies using standard (not just CoCo) OS/9 format. You can use single or double-sided 40 or 80 track drives with the SCSI no-halt controller.

There are several new features with this improved interface. These include:

- **Full SASI/SCSI compatible (this allows many add-ons to the versatile SCSI buss)**
- **No-Halt Floppies with optional SCSI controller allows full type-ahead during access**
- **Low factory-direct prices**
- **Fast Delivery from factory stock**
- **Optional Real Time Clock with built in battery (3-10 year lifetime)**
- **With the Clock you have 240 Bytes of battery backed up RAM for password protection or data storage!**
- **Same super stable LRTech quality**

Our quality is obvious when compared to any other Hard Drive system or interface. Even the box is special. Our systems have always had a fan. Has our competition just heard about them?

Interface Price only: $85.

Real Time Clock-RAM: $25.

20 Meg.	40 Meg.	80 Meg. (2X40Meg.)

System Prices: (Includes Hard Drive, case, & fan, SASI Controller*, LR/OWL Interface, Software. Fully assembled and tested.)

$519.	$629.	$929.

Super System Prices: (LR/OWL System as above but OMTI 5200 SCSI Controller AND 3.5" 80 Track Floppy Drive in same case)

$649.	$759.	$1099.(2 cases)

---

*SASI controller is unused surplus. Add $75 for OMTI SCSI

Now Available with High Density 5.25" drives as well as 720K!

Disk Capacity of more than 1 Meg Formatted!

Same low price as our 720K super systems listed below.

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 4 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

OWL HD BASIC 3 is very fast due to our index method. Almost all BASIC commands work normally including DSKINI, DSKI$, and DSKO$.

BASIC for Hard Drives Prices: With/Without Hard Drive

$35./$79.

Technology

the Color Computer Frontier

DISK DRIVES

Bonus!
Special
Bundled
Software
with any
Disk Drive
Purchase!

Floppy Drive Systems

The Highest Quality for Years of Service

Drive 0 Systems (Half Height, Double Sided, Direct Drives) **$199.**

Drive 0 systems complete with drive, controller, legal DOS, cable, case, power supply, and manual

Drive 1 Systems (Half Height, Double Sided, Direct Drives) **$129.**

New 3.5", 720K Drives for OS-9 with case & Power Supply **$169.**

Drive 1 Systems have drive, case, power supply. (You may require optional cable and/or DOS chip to use)

Special for 0/1 Combos (Drives 0,1,2,3) $295.

HALF- HEIGHT DRIVE UPGRADES FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model $119.	Model $129.
500	501 or 502

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)
1-800-245-6228
1-215-682-6855
Fax: 1-215-837-1942
Technical Help
1-215-837-1917

OWL WARE Software Bundle

Disk Tutorial/Utilities/Games

DISK TUTOR Ver 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

3 UTILITIES

A copy verify, copy, and DOS utility.

2 GAMES

We will select 2 games from our stock. These are sold for more than $20 each.

Do not mistake this software with cheap "Public Domain" software which others offer. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with
any Disk Drive Purchase!!

512K Upgrade

Again at a popular price. Fully assembled and tested before shipping. Easy to install. Uses fast 120 ns. chips.

Only $99.

Now includes **memory test, Ram Disk Lighting, Printer Lighting, and Backup Lighting.** All with an upgraded manual exclusive with OWL!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

OWL-WARE
P.O. BOX 116
Mertztown, PA 19539

A handy tool for testing low-speed logic circuits

Completing the Analyzer Project

by Dennis H. Weide

Last month we covered the design of the CoCo Digital Logic Analyzer and started its construction. This month we'll finish up with the final construction, testing and programming of it. Let's start with the input and the memory circuit.

Input and Memory Circuit

The input and memory circuit (shown in Figure 1) consists of three chips. IC11 (74LS244) buffers the input from the circuit under test. It is controlled by the HALT lead connected to pins 1 and 19. When the HALT lead goes high, IC11 goes to the high impedance state to prevent overwriting memory.

IC12 and IC13 are 8-bit by 2048-byte static random access memories (SRAMs). Although more costly than dynamic RAM, SRAM is much easier to use when designing your own peripheral circuitry. The 40-pin DIP socket shown in Figure 1 connects the analyzer to the interface circuit by means of a ribbon cable.

Figures 1 and 2 show the address and data buses as single lines to simplify the drawings. The data bus is actually eight separate wires designated D0 through D7. The address bus is actually 13 separate wires designated A0 through A12. When wiring the circuits, connect all D0 leads together, all D1 leads together, etc. Do not connect D0 lines to any other data lines. This holds true for all data and address bus lines.

As with the interface circuit, construction of the input and memory circuit should be easy. Use the same method you chose for the interface circuit and follow the same rules for supply and ground leads. Figures 1 and 2 should be constructed on the same circuit board. Photo 1 shows the input and memory circuit and the timing and trigger circuit mounted on the circuit board inside the analyzer case. Photo 2 shows the same view with the ribbon cable installed. Photo 3 shows a close-up view of the test probes connected to the eight data inputs, three trigger inputs, and analyzer ground. Table 1 is the parts list for the input and memory circuit.

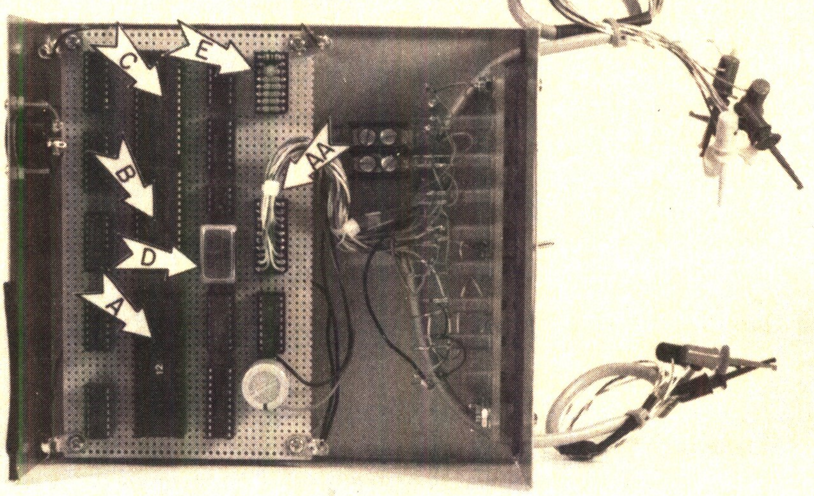


Photo 1. Top View of Analyzer Circuit Board

A. 40-pin DIP socket; B. IC12 Lo RAM; C. IC13 Hi RAM; D. TTL crystal oscillator; E. Resistors mounted on board; AA. Input, trigger and indicator connector.

Dennis Weide is a communications technician for AT&T. His hobbies include designing, building and programming computer peripherals for disabled persons. He may be contacted at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when requesting a reply.

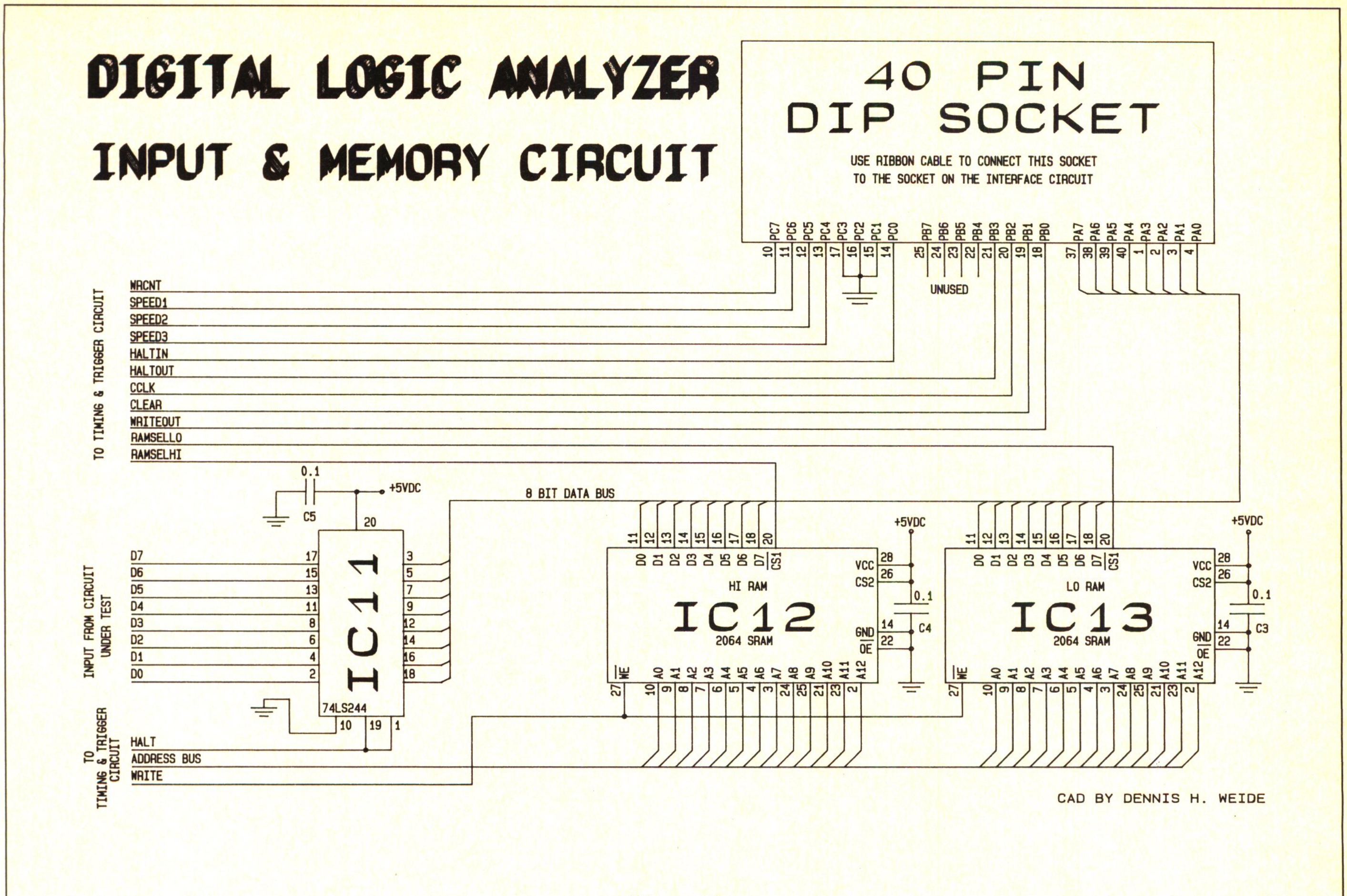

DIGITAL LOGIC ANALYZER
INPUT & MEMORY CIRCUIT
40 PIN
DIP SOCKET
USE RIBBON CABLE TO CONNECT THIS SOCKET
TO THE SOCKET ON THE INTERFACE CIRCUIT
PC7 PC6 PC5 PC4 PC3 PC2 PC1 PC0
PB7 PB6 PB5 PB4 PB3 PB2 PB1 PB0
PA7 PA6 PA5 PA4 PA3 PA2 PA1 PA0
UNUSED
TO TIMING & TRIGGER CIRCUIT
WRCNT
SPEED1
SPEED2
SPEED3
HALTIN
HALTOUT
CCLK
CLEAR
WRITEOUT
RAMSELLO
RAMSELHI
0.1
C5
+5VDC
8 BIT DATA BUS
INPUT FROM CIRCUIT UNDER TEST
D7 D6 D5 D4 D3 D2 D1 D0
IC11
74LS244
HI RAM
IC12
2064 SRAM
LO RAM
IC13
2064 SRAM
VCC
CS2
GND
OE
CS1
WE
C4
C3
TO TIMING & TRIGGER CIRCUIT
HALT
ADDRESS BUS
WRITE
CAD BY DENNIS H. WEIDE

Figure 1

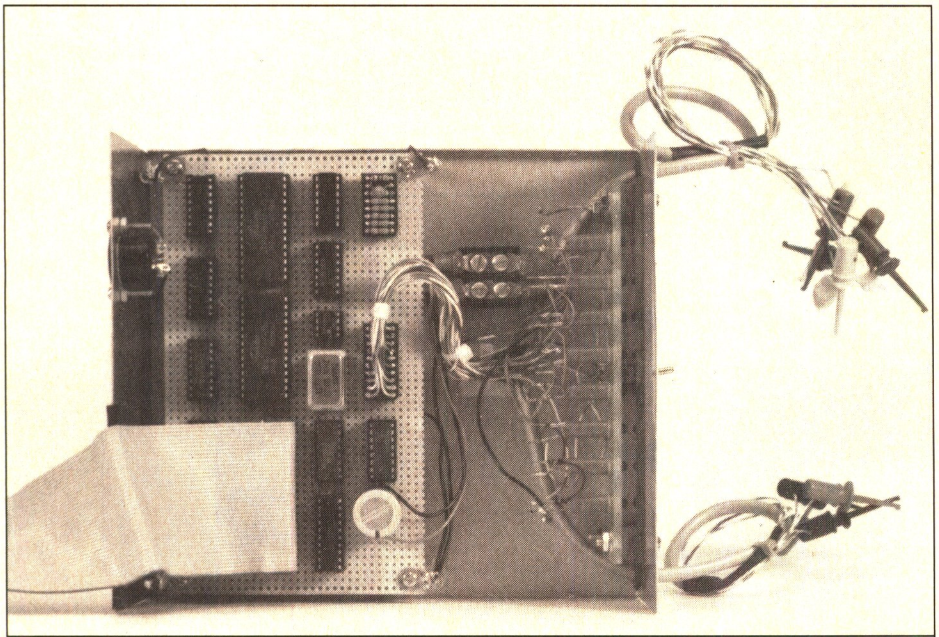


Photo 2. Top View of Analyzer Showing Ribbon Cable

Timing and Trigger Circuit

The timing and trigger circuit is shown in Figure 2. Again, use the same methods and guidelines previously mentioned when constructing this circuit. All LED indicators are shown in this figure. The address bus is shown as a single line in this schematic also. Table 2 shows the bus-to-chip assignments for the timing and trigger circuit address bus.

After you've built the circuits shown in Figure 3 from last month (the interface circuit) and figures 1 and 2, your analyzer is ready for testing. You may have noticed that the schematics for figures 1 and 2 have no power provided to them. I used an inexpensive AC-to-DC adapter with an output of 5 volts at 500 milliamps. If you can't find one, you can use a 9-volt adapter with a 7805 regulator chip to provide the proper voltage. Four C size nicad batteries will also work very well and may be your best choice. Table 3 is the parts list for the timing and trigger circuit.

When the analyzer is completely wired and inspected, you can test it. With all ICs and the TTL oscillator removed from their sockets, apply power to the circuit and measure the voltage at pins 14 (+5VDC) and 7 (GND) of IC1. A reading greater or less than +5 volts indicates a wiring error. Recheck all your work before proceeding. Once you measure the proper voltage, follow the steps below to test the clock circuit, clock rate selector, clock source selector, and address generator. This test also does a check of the HALT and RAM SELECT leads. The hardware tested consists of the TTL oscillator and IC4 through IC9.

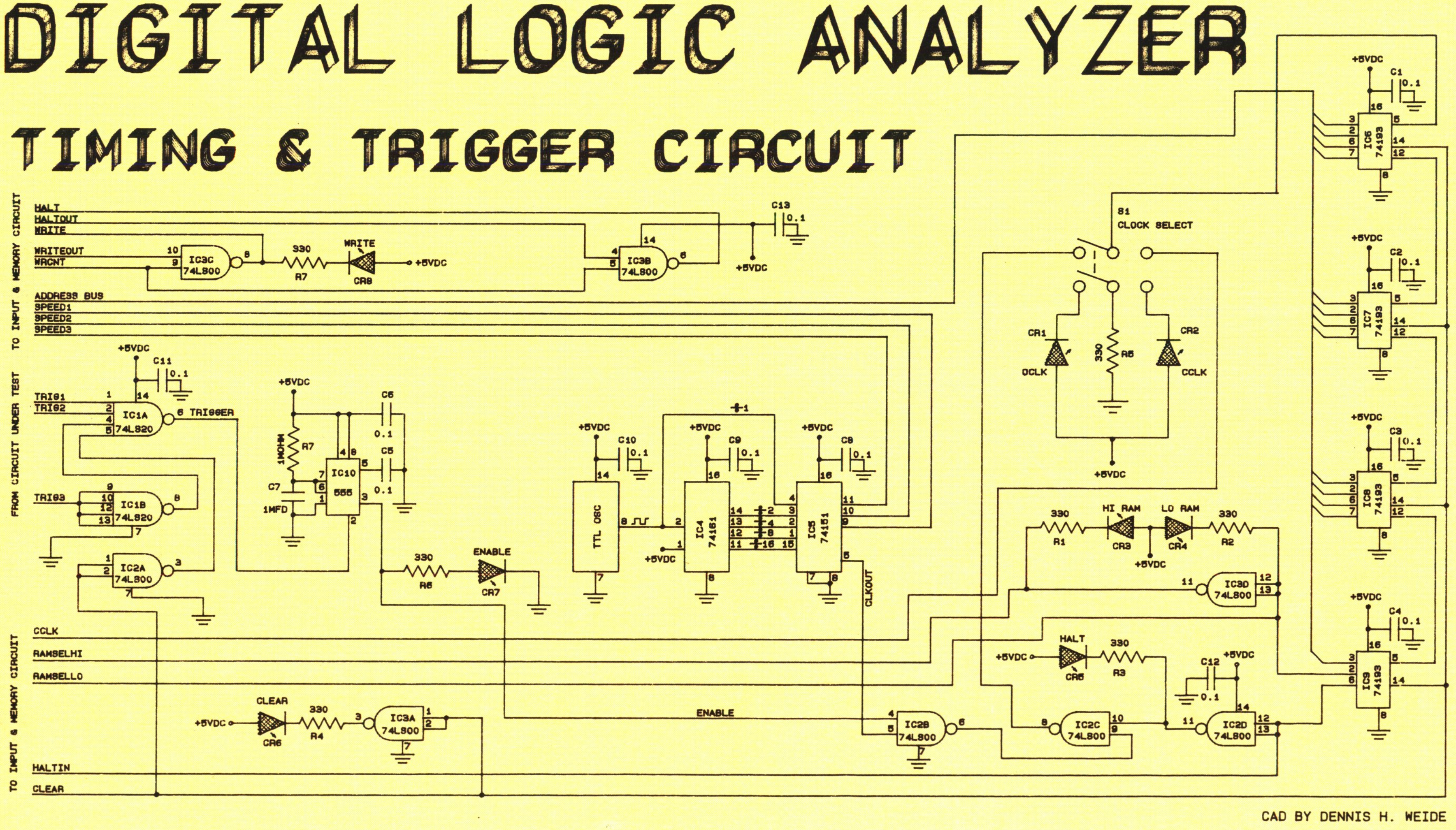

DIGITAL LOGIC ANALYZER
TIMING & TRIGGER CIRCUIT
TO INPUT & MEMORY CIRCUIT
HALT
HALTOUT
WRITE
WRITEOUT
WRCNT
ADDRESS BUS
SPEED1
SPEED2
SPEED3
FROM CIRCUIT UNDER TEST
TRIG1
TRIG2
TRIG3
TRIGGER
CCLK
RAMSELHI
RAMSELLO
HALTIN
CLEAR
IC1A 74LS20
IC1B 74LS20
IC2A 74LS00
IC2B 74LS00
IC2C 74LS00
IC2D 74LS00
IC3A 74LS00
IC3B 74LS00
IC3C 74LS00
IC3D 74LS00
IC10 555
TTL OSC
IC4 74161
IC5 74151
IC6 74193
IC7 74193
IC8 74193
IC9 74193
C1 0.1
C2 0.1
C3 0.1
C4 0.1
C5 0.1
C6 0.1
C7 1MFD
C8 0.1
C9 0.1
C10 0.1
C11 0.1
C12 0.1
C13 0.1
R1 330
R2 330
R3 330
R4 330
R5 330
R6 330
R7 330
R7 1MOHM
CR1 DCLK
CR2 CCLK
CR3 HI RAM
CR4 LO RAM
CR5 HALT
CR6 CLEAR
CR7 ENABLE
CR8 WRITE
S1 CLOCK SELECT
ENABLE
CLKOUT
+5VDC
÷1
CAD BY DENNIS H. WEIDE

Figure 2

<<< GIMMESOFT >>>

A new generation of Color Computer products

V-Term Terminal

-Vax, Unix, Mainframe, and BBS systems
-Vt-100, Vt-52, Vidtex & Ascii emulations
-Serial port to 2400, RS-232 to 19,200 baud
-XModem, XModem-CRC, YModem, ASCII
-15 entry autodial, 10 programmable macros
Disk (128k or 512k CoCo 3 only) $39.95

Telepak II RS-232

A Truly Compatible RS-232 Interface!
It comes with a 3 foot DB25 cable, gold edge contacts, and low power drain (5v) components.
Telepak II & Manual $49.95

Xport
Extended
Port
Interface

Xport

NEW

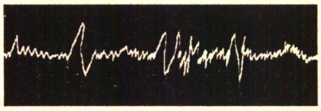
The replacement for the Multi-Pak Interface is here! Xport is just that, an extended port interface that is buffered (unlike a Y-Cable), has 3 ports (2 switchable), and has it's own 12v supply for those devices that require it. Xport is made with the same quality & workmanship as Telepak II

Xport and Manual $74.95

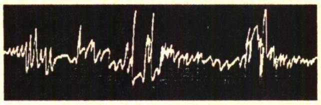
Turbo 512k Ram

-Fully assembled and tested board
-Premium 120ns 256x1 memory chips
-Easy to follow instructions
-Fast and easy installation
-Complete with 512k software
-RamDisk, RamTest, & Print Spooler

Holiday Sale Price >>> $89.95
0k board w/software ... $34.95



Studio Works
Digital Audio Sampler



Studio Works

A totally professional Digital Audio Sampler that is second to none! Studio works features point & click, cut & paste, overlay, reverse, volume control, sequencing, compression and much much more. Samples up to 17k/second.
W/O cable - $38.95 W/cable - $53.95

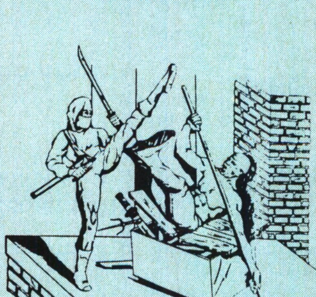
Soundtrax

The perfect partner for Studio Works! Soundtrax is a sound sequencing system that imports digitized audio samples & provides total control.
For CoCo 3, mouse/joystk, & disk $34.95

Games

Warrior King	$29.95*
Kung-Fu Dude	$24.95
In Quest of the Starlord	$34.95*
Hint sheet for Starlord	$3.95
Pyramix	$19.95*
Hall of the King 1 2 or 3	$29.95
Dragon Blade	$19.95
White Fire of Eternity .	$19.95
Champion	$19.95

* CoCo 3 only



Kyum-Gai: to be Ninja

Kyum-Gai: to be Ninja uses the most detailed 320x200 resolution, 16 color graphics, the highest quality digital sound effects, and spectacular animation to bring you the greatest martial arts game your CoCo 3 has ever seen!
For CoCo 3, joystick, & disk $29.95

Paladin's Legacy $24.95
You will love the feeling of playing an action game with great graphics, animation, and sound effects, but all the while solving one of the most involved adventures yet! CoCo 1,2, or 3 & disk.

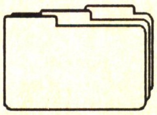
Sinistaar 512k CoCo 3 .. $34.95
Experience the fast-paced action of 512k packed with spectacular graphics and sound effects!

CoCo 3 $29.95 NEW

Suprfile III

NEW MS/Dos $39.95

Suprfile III is a powerful, user friendly, easy to use, multi-purpose database! It can be used for Mailing lists, Labels, a Checkbook Manager, Shopping lists, Personal items inventory, Audio/Video lists and on and on! Features: Add, Delete, Search, Sort, Print Labels & Reports.



Fkeys III	(CoCo 1,2, 3)	$19.95
Sixdrive	(CoCo 1,2, 3)	$16.95
Locking Plates	(CoCo 2 or 3)	$7.95
Multi-Label III	(CoCo 3 only)	$16.95

Toll Free 1-800-441-GIME Order Line

Free 2ND AIR from Midwest to California
Orders: 9am to 9pm Eastern time
On-line orders: Delphi's CoCo Sig
Inquiries & technical assistance: 7pm to 9pm:

GIMMESOFT
P.O. Box 421
Perry Hall, MD 21128
301-256-7558

Add $3.00 for shipping and handling
Add $3.00 for COD (USA only)
MD residents add 5% sales tax
VISA/MC/Check/Money Order/COD

Part #	Description
IC11	74LS244
IC12-IC13	2064 Static RAM
C3-C5	.1 MFD
Misc	PC board, wirewrap sockets, wire, 40-pin DIP wirewrap socket

Note: For 10 MHz operation, SRAM chips must have an access speed of 100 ns or faster.

Table 1. Input & Memory Circuit Parts List

Bit	IC#	Pin
A0	6	3
A1	6	2
A2	6	6
A3	6	7
A4	7	3
A5	7	2
A6	7	6
A7	7	7
A8	8	3
A9	8	2
A10	8	6
A11	8	7
A12	9	3

Table 2. Address Bus-to-Chip Connections for Figure 2.

Part #	Description
IC1	74LS20
IC2,IC3	74LS00
IC4	74161
IC5	74151
IC6-IC9	74193
C1-C6	.1 MFD
C7	1 MFD
C8-C13	.1 MFD
CR1-CR8	Red LED
R1-R6	330 ohm, ¼ Watt
R7	10 megohm, ¼ Watt
R8	330 ohm, ¼ Watt
Misc	PC board, IC sockets, wire, TTL oscillator (10MHz; available from Jameco)

Table 3. Timing & Trigger Circuit Parts List

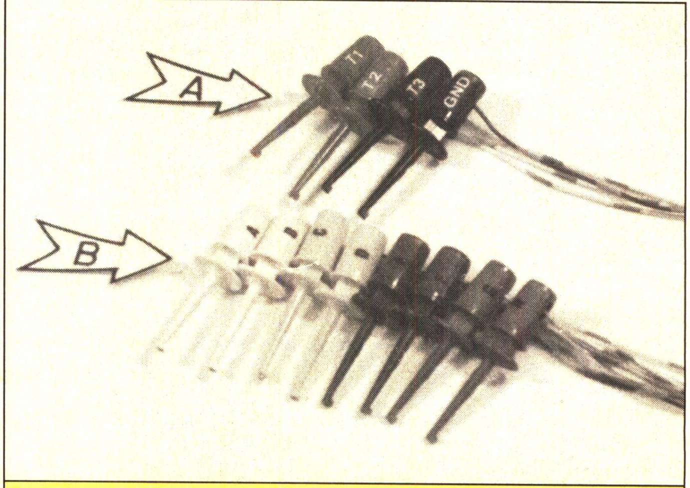


Photo 3. Analyzer Test Inputs

A. Trigger inputs 1 through 3 and ground; B. Data inputs A through H (bits 0 through 7).

Test 1

1 — Be sure power is off. Plug the TTL oscillator and IC4 through IC9 into their respective sockets.

2 — Connect the logic indicator (from last month) to the analyzer board per Table 4.

3 — Connect Pin 4 of IC2 to logic High.

4 — Connect Pin 8 of IC2 to Pin 5 of IC6.

5 — Connect Pin 14 of IC9 to logic High.

6 — Plug the interface circuit into the CoCo ROM port. (Be sure power is off.)

7 — Connect interface circuit to the analyzer using 40-pin ribbon cable.

8 — Turn CoCo power on.

9 — `POKE &HFF43,145` and press ENTER to program the 8255 PPI chip.

10 — `POKE &HFF42,X` (where `X` is the value listed in Table 5).

11 — Refer to Table 5 for LED indications. H designates High. L designates Low.

12 — If results obtained in Step 11 are correct, remove the logic High from Pin 14 of IC9. The following sequence of events should occur:

A. Probes 4, 5 and 6 should remain in the same state as shown in Table 5.

B. Probes 2 and 3 should flash until Probe 1 goes High.

C. When Probe 1 goes High, probes 2 and 3 should go Low.

Repeat the procedure from step 10 for each value of `X` shown in Table 5. Each successive test should cause probes 1, 2 and 3 to flash at a rate slower than the previous test.

After the analyzer has passed this test, proceed to the address generator and trigger circuit test shown below:

Test 2

1 — With all power off, unplug the ribbon

Probe	IC#	Pin#
1	9	6
2	9	2
3	9	3
4	5	9
5	5	10
6	5	11
7	n/c	
8	n/c	
+5v	12	26
GND	12	7

Table 4. Logic Indicator Connections to Analyzer Circuit for Test 1

X	Probes								Freq
Value	1	2	3	4	5	6	7	8	KHZ
0	L	L	L	L	L	L	X	X	1000 (1MHZ)
16	L	L	L	L	L	H	X	X	500
32	L	L	L	L	L	L	X	X	250
48	L	L	L	L	L	H	X	X	125
64	L	L	L	L	L	L	X	X	62.5

Note: X=DON'T CARE

Table 5. Logic Indicator Results When Value X is Poked into Address $FF42

cable from the analyzer board.

2 — Connect the logic indicator to the analyzer board as shown in Table 6.

3 — Connect Pin 11 of IC4 to Pin 5 of IC2 using a clip cord.

4 — Set the clock source switch to the OCLK position.

5 — Remove the following ICs from their sockets: IC1, IC3, IC11, IC12, IC13.

6 — Connect Pin 2 of IC10 to a logic High.

7 — Connect Pin 14 of IC9 to ground.

8 — Turn the analyzer power on. All logic indicators should be Low. If not, momentarily remove the ground from Pin 14 of the IC9.

9 — When all logic indicators indicate Low, momentarily ground Pin 2 of IC13.

10 —Probe 8 should go High and probes 7 through 1 should count in binary (each LED should flash once for every two flashes of the LED to its right). When Probe 1 goes High, probes 2 through 7 should go Low. Then Probe 8 should go High.

11 — Repeat from Step 8 until satisified that the circuit works correctly.

This test checks the ENABLE gate generated by the 555 timer (IC10), the TTL oscillator, the countdown circuit (IC4), the address generator (IC6-IC9), and the HALT circuit, which is part of IC2.

The Programs

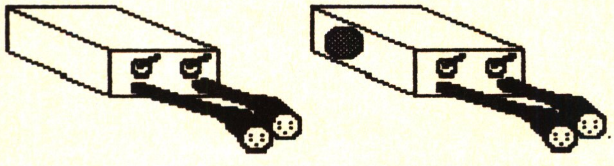
Now that you've built and debugged your analyzer hardware, it's time to tackle the software. Program Listing 1 is the BASIC program required to use the analyzer. I'll just cover it briefly.

Line 140 clears the necessary string memory and protects the addresses where the machine language programs will be located. It also sets the printer baud rate and programs the 8255 PPI internal register for use by the analyzer. The value poked into the internal register determines which ports are inputs and which are outputs.

Lines 180 through 200 contain the data for the three machine language programs used to speed up data processing. Program listings 2, 3 and 4 are the source code for these programs. It's not necessary to type them into the computer. Lines 210 through 290 poke the machine language data into memory. The program listings are shown here for your information only.

Lines 300 through 320 create the strings necessary for drawing the screen reference information.

Several commands (listed in Table 7) are included in the program. They are shown below with a brief explanation. Each com-



NOW TWO MODELS TO CHOOSE FROM !!

ORIGINAL MODEL - Colorware Hi-Res,
Tandy Hi + Low Res, cassette jack.

ECONOMY model - Tandy Hi + Low Res.

ORIGINAL $40 ECONOMY $27

HAWKSoft keyboard extend cable $25
DOMINATION "risk"-like war game $18
MYDOS the extended DOS for you! $15

HAWKSoft P.O. Box 7112 Elgin, Il 60121
(708) 742-3084 eves and ends
SASE for more info and price list.
S/H (US & CAN) always included

BYTE BACK
AT TAXES
WITH TRY-O-TAX

- available for CoCo, MSDOS, TRS-80
- revised for '89 law changes
- prompts for easy guided use
- calculates 1040, 1040A, 2441, 2106, 6502
- calculates schedules A-F, SE
- computer generated substitute forms
- FREE TAX ESTIMATE PROGRAM

PERSONAL CHECKS WELCOME
SHORT FORM ALONE $15.00
NO CREDIT CARDS, C.O.D.

$44.99 + 3.00 SHIPPING

TRY-O-BYTE, 1008 Alton Circle, Florence, S.C. 29501, (803) 662-9500
ORDER 1-800-476-4265 ONLY

Logic Probe	IC#	Pin#	Lead Desig.
1	8	3	A8
2	8	2	A9
3	8	6	A10
4	8	7	A11
5	9	3	A12
6	9	2	A13
7	9	6	A14
8	10	3	ENABLE
+5V	10	8	VCC
GND	10	1	GND

Table 6. Logic Indicator Connections

Key to Press	Function
A	Again - start a new test
C	Cursor - add cursor to screen
E	Erase - erase last cursor increment
I	Increment - select cursor increment
T	Timeslot - select a new time slot
X	Exit - exit basic program
Left Arrow	Move Left - move cursor left
Right Arrow	Move Right - move cursor right

Table 7. Commands

Test Lead	ROM Pin	Lead Desig.
T3	36	SCS
A	36	SCS
B	18	R/W
C	6	E CLK
D	19	A0
E	20	A1
F	10	D0
G	11	D1
H	12	D2
GND	33	GND

Table 8. Analyzer Test Connections

`FACTOR` Variable	$3BAD
`TIMESLOT` Variable	$3BAE - $3BAF
`ZEROBUF.ASM`	$3BBO - $3BBB
`MOVESRAM.ASM`	$3BCO - $3BDF
`FACTOR.ASM`	$3BE6 - $3BFA
Display Buffer	$3COO - $3CEF
DRAM Buffer	$3DOO - $7CFF

Table 9. Program, Variable and Buffer Locations

mand requires pressing only a single key to execute it.

The Again command allows you to start a complete new test by pressing the A key once. All analyzer and CoCo buffers are erased and the analyzer is reset for a new test. You are prompted for all the necessary information again.

The Cursor command places a cursor (vertical line) at the center of the screen when the C key is pressed. The cursor can be used to compare traces or for measuring timeslots. Multiple cursors can be placed on the screen by pressing C once for each new cursor.

The Erase command erases the last cursor displayed on the screen when the E key is pressed. Once an additional cursor has been placed on the screen, all cursors previously displayed cannot be moved or erased.

The Increment command toggles the cursor increment value. The initial increment value is set at 1. Each time the arrow key is pressed, the cursor moves one timeslot. When the I key is pressed, the increment value changes to 10. Therefore, each time the cursor is moved, it moves ten timeslots. The increment value can be toggled back and forth by pressing I.

The Timeslot command returns the program to the text screen and prompts you for the new timeslot each time the T key is pressed. This allows you to view different areas of the collected data. The timeslot command only affects the screen display and has no effect on data already collected.

The Exit command exits the BASIC program by pressing the X key. You can restart the program where you left it by typing `CONT` and pressing ENTER.

The left arrow moves the cursor left by the amount of the increment value each time the key is pressed. The right arrow moves the cursor to the right in a similar fashion.

A Sample Display

Now let's see what a screen display looks like. Figure 3 is a printout of the actual screen display for the final test of the Digital Logic Analyzer. Eight traces of data are displayed on the screen at one time. The lead that corresponds to each trace is shown on the left of the screen (letters A through H). The values 0 and 1 shown indicate the Low (0) and High (1) logic levels. As an example, on the A trace, the trace starts out low then almost immediately jumps high for one pulse and returns low again for a longer period.

The bottom line of the screen displays the starting timeslot (shown as 00000), the cursor increment value (shown as 01), the cursor timeslot (shown as 00144) and the end timeslot (shown as 00239). The vertical line from the top to the bottom of the screen is the cursor position, currently at Timeslot 144.

Final Testing of the Analyzer

Before we can assume the analyzer is useful, it must be tested on a circuit that produces known results. Therefore, we'll test it using another CoCo and compare the results with information provided in the CoCo service manual.

Addresses $FF40 through $FF5F are for use with the ROM port. Whenever the CoCo reads or writes to any address in this range, it sets the SCS lead low during the operation. To test the analyzer circuitry, we'll use a program that repeatedly writes all ones (255) to Address $FF40. Since BASIC is an extremely slow language, the test program must be written in machine language. Program Listing 5 is a BASIC program that pokes a short ML program into memory and executes it. Program Listing 6 is the source code for the BASIC version in Listing 5.

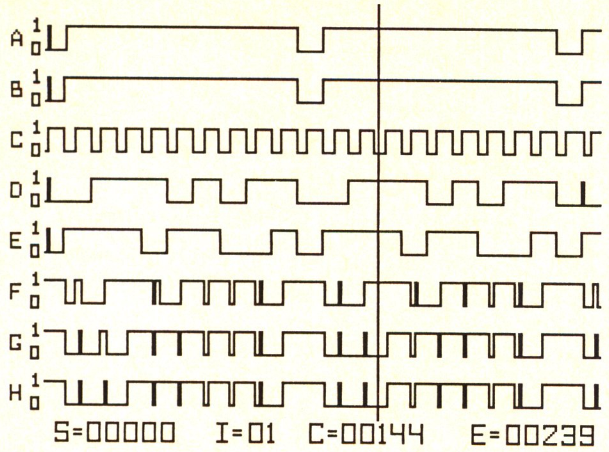


Figure 3

Analyzer Verification Tests

If you don't have a second CoCo available to you, you can use any TTL circuit that will produce known results for comparison. Follow the steps listed below if you want to verify your analyzer using my method.

Analyzer Test Procedure

Note: For the purpose of this test, the CoCo used as the analyzer processor is called CoCo A. The CoCo used as the test circuit is called CoCo B.

1 — All power should be off. Plug the analyzer ROM pack into the CoCo A ROM port.
2 — Turn on analyzer power.
3 — Turn on CoCo A power.
4 — Load analyzer program from cassette into CoCo A.
5 — Connect the analyzer trigger and data leads to the ROM port pins of CoCo B as per Table 8.
6 — Turn on CoCo B power.
7 — Key Listing 5 into CoCo B. Do not run it yet.
8 — Run the program in CoCo A and select zero (0) for the clock speed prompt if you are using a 10 MHz TTL oscillator chip.
9 — Set the analyzer clock source selector switch to the OCLK position per the CoCo A prompt. On the analyzer, the OCLK, CLEAR and LO RAM LEDs should be lighted.
10 — On CoCo A, press ENTER. The OCLK, Write and LO RAM LEDs should now be lighted on the analyzer.
11 — Run the program in CoCo B. The analyzer will trigger when the SCS lead goes Low. The following LED indications will take place. This may happen very fast and you may have to execute several tests to verify all conditions.

Enable will light
Lo RAM will extinguish
Hi RAM will light
Halt will light
Clear will light
Hi RAM will extinguish
Lo RAM will light
Enable will light
CoCo A will display a System Halt Detected message

12 — On analyzer, set clock source selector to CCLK per CoCo A prompt. CCLK, CLEAR and LO RAM should be lighted.

Make Some Handy Tandy Connections.

The largest group of Tandy® users in the world shares its problems and solutions online every day in CompuServe's Tandy Forums. And you can join them.

You'll find users of every kind of Tandy computer, who have worked the bugs out of any application you're likely to encounter – from CoCo games and the OS-9 operating system to the most advanced programming problems for MS-DOS® desktops and laptops.

Tandy Forums are the first place you'll hear about new products, sometimes even as they're being developed. Find out which software is best for your applications. And keep up with the latest information on upgrades as soon as they're available. There's no better way to get more out of your Tandy.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. If you're already a member, type GO TANDYNET at any ! prompt.

CompuServe®

Editor's Note: The assembly language listings presented are for reference only and will not appear on RAINBOW ON DISK/TAPE.

190	40
290	72
350	220
410	119
530	78
600	34
720	148
800	206
920	230
1030	102
1160	220
1320	142
1450	82
1580	122
1710	29
1830	205
END	210

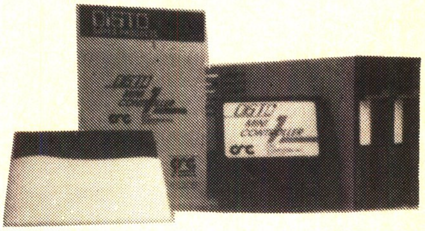
Listing 1: ANALYZER

```
0 ' COPYRIGHT 1990 FALSOFT, INC
100 ' DIGITAL LOGIC ANALYZER
110 ' BASIC PROGRAM
120 ' WRITTEN BY DENNIS H. WEIDE
130 '
140 CLEAR150,&H3B00:POKE150,1:PO
KE&HFF43,145:'PROGRAM 8255
150 CLS:PRINT" DIGITAL LOGIC ANA
LYZER PROGRAM"
160 PRINTTAB(7)"BY DENNIS H. WEI
DE"
170 DIM GR(20),BL(5),B1(13)
180 DATA 4F,8E,3D,0,A7,80,8C,7C,
FF,2F,F9,39
190 DATA 8E,3D,0,4F,B7,FF,41,B6,
FF,40,A7,80,86,4,B7,FF,41,4F,B7,
FF,41,B6,FF,40,A7,80,8C,7C,FF,2F
,ED,39
200 DATA BE,3B,AE,10,8E,3C,0,B6,
3B,AD,A4,80,A7,A0,10,8C,3C,EF,2F
,F3,39
210 FORX=&H3BB0 TO &H3BBB
220 READA$:A$="&H"+A$
230 POKEX,VAL(A$):NEXTX
240 FORX=&H3BC0 TO &H3BDF
250 READA$:A$="&H"+A$
260 POKEX,VAL(A$):NEXTX
270 FORX=&H3BE6 TO &H3BFA
280 READA$:A$="&H"+A$
290 POKEX,VAL(A$):NEXTX
300 FORX=0TO9:READN$(X):NEXT
310 DATA U8R5D8NL5BR3,R2LU8NGBR4
BD8,NR5UE5U2L5NDR5BR3BD8,NUR5U4N
L4U4L5DUBR8BD8,BU4NU4R5U4D8BR3
320 DATA UDR5U5L5U3R5BR3BD8,R5U4
L5D4U8R5DBR3BD7,UE5U2L5NDBR8BD8,
NR5U4NR5U4R5D8BR3,NUR5U8L5D4R5BR
3BD4
330 EXEC&H3BB0:POKE&HFF41,2:'ZER
OBUF & CLR FF
340 PRINT:PRINTTAB(7)"ENTER CLOC
K SPEED":PRINT
350 PRINTTAB(10)"0. DIV BY 1":PR
INTTAB(10)"1. DIV BY 2":PRINTTAB
(10)"2. DIV BY 4":PRINTTAB(10)"3
. DIV BY 8":PRINTTAB(10)"4. DIV
BY 16"
360 PRINTTAB(10)"";:INPUT"SPEED
>";S
370 S$="&H"+HEX$(S)+"0":S=VAL(S$
):POKE&HFF42,S+128
380 PRINT:PRINTTAB(7)"SET SWITCH
 TO OCLK"
390 PRINTTAB(5)"";:LINEINPUT"PRE
SS <ENTER> TO BEGIN";B$
400 POKE&HFF41,9:'ENABLE FF & SR
AM WRITE
410 I$(1)="BM104,190;NR5U8R5D8BR
3R2LU8G"
420 I$(2)="BM104,190;R2LU8NGBR4R
5D8L5U8"
430 '
440 ' CALCULATE START OF TRACE
450 '
460 FORX=0TO7
470 P$(X)="BM15,"+STR$(22*X+20)+
";"
480 NEXTX
490 '
500 ' WAIT FOR HALT & ENTER INFO
510 '
520 IFPEEK(&HFF42)AND1THEN530ELS
E520:'CHECK FOR HALT
530 POKE&HFF42,S:CLS:PRINT:PRINT
TAB(6)"SYSTEM HALT DETECTED":PRI
NT:PRINT
540 POKE&HFF41,2:FORX=1TO1000:NE
XT:'CLR SRAM WRITE & FF
550 PRINTTAB(7)"SET SWITCH TO CC
LK"
560 PRINTTAB(9)"PRESS <ENTER>";
570 LINEINPUTB$:EXEC&H3BC0:'MOVE
 SRAM TO DRAM
580 PRINT:PRINTTAB(6)"";:LINEINP
UT"ENTER TIME SLOT>";TS$:TS=VAL(
TS$)
590 IFTS<0ORTS>16144THENTS=16144
600 PMODE4,1:PCLS5:COLOR0:POKE65
495,0
610 GET(10,10)-(23,20),BL,G
620 GET(143,181)-(182,191),B1,G
630 '
640 ' DRAW A-H INPUT DESIGNATION
S
650 '
660 DRAW"BM0,18;U4E2F2D4U2L4"
670 DRAW"BM0,40;U6R3D3NL3RD3L4"
680 DRAW"BM0,62;R4NUL4U6R4D"
690 DRAW"BM0,84;U6R3FD4GL3"
700 DRAW"BM0,106;NR4U3NR3U3R4"
710 DRAW"BM0,128;U3NR3U3R4"
720 DRAW"BM0,150;R4U2NLD2L4U6R4D
"
730 DRAW"BM0,172;U6BR4D3NL4D3"
740 DRAW"BM20,190;NUR5U4L5U4R5DB
D2BR3R3BD2L3"
750 DRAW"BM90,190;R4L2U8NL2R2BR3
BD3R3BD2L3"
760 DRAW"BM200,190;NR5U4NR4U4R5B
R3BD3R3BD2L3"
770 DRAW"BM130,190;R5UDL5U8R5DBR
3BD2R3BD2L3"
780 DRAW"BM144,190;":T=0:GOSUB13
90
790 DRAW"BM34,190;":T=TS:GOSUB13
90
800 DRAW"BM215,190;":T=TS+239:GO
SUB1390
810 I=1:DRAW"XI$(1);"
820 '
830 ' DRAW LOGIC LEVEL INDICATOR
S
840 '
850 A$="R2LU5G"
860 B$="U5R3D5L3"
870 FORX=0TO7
880 C$="BM10,"+STR$(22*X+12)+";"
+A$
890 D$="BM9,"+STR$(22*X+22)+";"+
B$
900 DRAW"XC$;":DRAW"XD$;"
910 NEXT
920 '
930 ' CALCULATE TIME SLOT OFFSET
940 '
950 TS=TS+15616:T1=INT(TS/256):T
2=(TS/256)-INT(TS/256):T2=T2*256
960 '
970 ' LOAD MEMORY WITH ML PARAME
TERS
980 '
990 POKE&H3BAE,T1:POKE&H3BAF,T2:
'PASS TIMESLOT
1000 FORY=0TO7
1010 POKE&H3BAD,2^Y:'PASS POWER
OF 2
1020 EXEC&H3BE6:'FIND BIT SET
1030 SCREEN1,1
1040 IFPEEK(&H3C00)>0THENLA=1ELS
ELA=0
1050 DRAW"XP$(Y);"
1060 '
1070 ' READ BUFFER AND DRAW TRAC
E
1080 '
1090 IFLA=1THENDRAW"BU10"
1100 FORX=&H3C00 TO&H3CEF
1110 A=PEEK(X)
1120 IFA>0THENA=1
1130 IFA=1ANDLA=1THENDRAW"R"
1140 IFA=1ANDLA=0THENDRAW"U10R"
1150 IFA=0ANDLA=0THENDRAW"R"
1160 IFA=0ANDLA=1THENDRAW"D10R"
1170 LA=A
1180 NEXTX,Y:POKE65494,0
1190 '
1200 ' COMMAND INPUT SECTION
1210 '
1220 I$=INKEY$
1230 IFI$=""THEN1220
1240 IFI$="C"THEN1500
1250 IFI$=CHR$(8)THEN1590
1260 IFI$=CHR$(9)THEN1680
1270 IFI$="A"THENCLS:GOTO330
1280 IFI$="T"THENPRINT:GOTO580
1290 IFI$="E"THEN1820
1300 IFI$="X"THENSTOP
1310 IFI$="I"THEN1320ELSE1220
1320 IF I=1 THEN I=10 ELSE I=1
1330 PUT(103,180)-(116,190),BL,O
R
1340 IF I=1 THEN DRAW"XI$(1);" E
LSE DRAW"XI$(2);"
1350 GOTO1220
1360 '
1370 ' PRINT TIMESLOTS
1380 '
1390 M$=STR$(T):M=LEN(M$)-1
1400 M$=RIGHT$(M$,M)
```

Color Computer I, II, III

Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.
Tape/Disk Utility...Transfers disk to tape and tape to disk.



159^95^ Drive 0

- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

179^95^ Drive 0

- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

269^95^ Drive 0 & 1

- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

Other Drive Specials

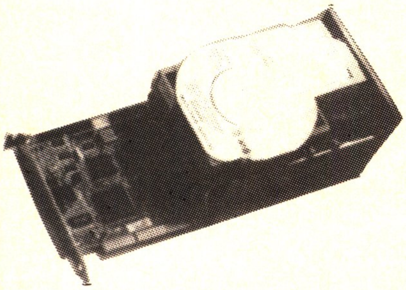
119^95^
2nd Drive
for new Radio Shack
includes:

- Slim Line DS/DD Drive
- Cabling & Instructions
- Mounting Hardware

Full Ht Drive	89^95^
Full Ht Drive Ps/Case	129^95^
Slim Line Drive	99^95^
Slim Line Drive Ps/Case	139^95^
2 Slim Drives Ps/Case	239^95^
Disk Controller	59^95^

Single Ps & Case	44^95^
Dual ½ht Ps & Case	54^95^
Disk Controller	59^95^
Disk Controller w/ROM	79^95^
Memory Upgrades with CoCo 3	CALL

Quality Add-On's for Tandy® 1000, SX, TX, SL, TL, 3000, 4000



20 Meg Drive Card	65 MS	$269.95
20 Meg Drive Card	45 MS	$289.95
32 Meg Drive Card	45 MS	$329.95
40 Meg Drive Card	60 MS	$369.95
49 Meg Drive Card	32 MS	$419.95
64 Meg Drive Card	23 MS	$569.95

Call for current pricing

Tandy® EX, HX

384K Memory Expansion Card
Includes 384K
$189.95

Tandy® EX, HX

External Hard Drive Kits

10 Meg	$299.95
20 Meg	$389.95
30 Meg	$429.95
40 Meg	$499.95

Tandy® EX, HX

360K or 720K External Floppy
For EX or HX
$139.95

1000, SX, TX, SL, TL, 3000, 4000

2nd Floppy

360K	TEAC	$119.95
720K	Mitsubishi	$99.95
3½"	Mitsubishi	$119.95

1000, 1000A

Memory Board with 512K
Expands memory to 640K
$199.95

1000, SX, TX, SL, TL

Hard Drive Controller
Will run 1 or 2 Hard Drives
Supports drives up to
120 Megabytes
$99.95

1000, SX, TX, SL, TL, 3000, 4000

Memory Upgrades
From
$50

Tandy® 1000 SL/2, TL/2

IDE Drives

20 Meg	CALL
40 Meg	CALL

Tandy® is a registered trademark of Tandy Corporation

1ST QUALITY
MERCHANDISE
QUALITY
CUSTOMER SERVICE
508-278-6555
TECHNICAL ASSISTANCE
508-278-6556
FOR YOUR PROTECTION
WE CHECK FOR
STOLEN CREDIT CARDS.

TRUE DATA PRODUCTS

P.O. Box 347, 115 So. Main Street
Uxbridge, MA 01569
Tel. 508-278-6555
1-800-635-0300
Hours: 9 a.m.-6 p.m., Sat. 10 a.m.-4 p.m.

CORPORATE P.O.'s WELCOMED.

ALL PACKAGES SHIPPED UPS EXCEPT CANADA AND A.P.O.'s. C.O.D.'s ADD $3.30. MASTERCARD/VISA ADD 2%

ALL RETURNS MUST HAVE RMA# (CALL 508-278-6555). YOU MAY BE SUBJECT TO A RESTOCKING FEE. SHIPPING/HANDLING CHARGES NON-REFUNDABLE.

1 YEAR WARRANTY UNLESS OTHERWISE NOTED. PRICES/TERMS/CONDITIONS SUBJECT TO CHANGE WITHOUT NOTICE.

13 — On CoCo A, press ENTER. Data is now being transferred from the analyzer to CoCo A. ENABLE, CCLK and HI RAM should be lighted. Data transfer is complete when CoCo A displays the Enter Timeslot prompt.

14 — Enter the timeslot you want to view. For this test, enter 0. Data is processed and the screen display is drawn.

Analyzing Test Results

Now that our data is displayed on the screen, we must analyze it. Let's look again at Figure 3, the screen display for this test. First we must know what to look for in our results. We know the SCS lead only goes low when the CoCo reads or writes to Address $FF40. The test program repeatedly writes a 255 to that address. Test lead A and trigger lead T3 are connected to the SCS lead. The T3 trigger lead requires a low signal when active. When SCS goes low, the analyzer triggers and data collection begins.

In Figure 3, we can see that test lead A starts low, goes high and then low again. We have to disregard this first occurance because the analyzer circuits are in transition when first triggered so the data is not accurate. Since we're looping through the test program, we can use all subsequent occurences. Around the middle of the screen display, we can see that the SCS lead again goes low, indicating the CoCo is writing to Address $FF40. We'll use this as our first valid test.

```
1410 M$="0000"+M$
1420 M$=RIGHT$(M$,5)
1430 FORR=1TO5
1440 V=VAL(MID$(M$,R,1))
1450 DRAW"XN$(V);"
1460 NEXTR:RETURN
1470 '
1480 ' DISPLAY CURSOR ON C COMMA
ND
1490 '
1500 G1=127:G2=129:L1=128
1510 GET(G1,0)-(G2,180),GR,G
1520 LINE(L1,0)-(L1,180),PSET
1530 PUT(143,181)-(182,191),B1,O
R
1540 GOSUB1770:GOTO1220
1550 GOTO1220
1560 '
1570 ' MOVE CURSOR LEFT
1580 '
1590 PUT(G1,0)-(G2,180),GR,OR
1600 G1=G1-I:G2=G2-I:L1=L1-I
1610 IF G1<14 THEN G1=14:G2=16:L
1=15
1620 GET(G1,0)-(G2,180),GR,G
1630 LINE(L1,0)-(L1,180),PSET
1640 GOSUB1770:GOTO1220
1650 '
1660 ' MOVE CURSOR RIGHT
1670 '
1680 PUT(G1,0)-(G2,180),GR,OR
1690 G1=G1+I:G2=G2+I:L1=L1+I
1700 IF G1>253 THEN G1=253:G2=25
5:L1=254
1710 GET(G1,0)-(G2,180),GR,G
1720 LINE(L1,0)-(L1,180),PSET
1730 GOSUB1770:GOTO1220
1740 '
1750 ' UPDATE CURSOR LOCATION
1760 '
1770 PUT(143,181)-(182,191),B1,O
R
1780 T=TS+G1-15616-14:DRAW"BM144
,190;":GOSUB 1390:RETURN
1790 '
1800 ' ERASE CURSOR
1810 '
1820 PUT(G1,0)-(G2,180),GR,OR
1830 T=0:G1=127:G2=129:L1=128:PU
T(143,181)-(182,191),B1,OR:DRAW"
BM144,190;":GOSUB1390:GOTO1220
1840 POKE65497,0:FORX=&H3D00 TO
&H7CFF
1850 POKEX,PEEK(&HFF40)
1860 POKE&HFF41,4:POKE&HFF41,0
1870 NEXT:POKE65496,0:RETURN
1880 POKE&HFF41,0:FORX=&H3D00 TO
 &H7CFF
1890 PRINTPEEK(X),PEEK(&HFF40)
1900 POKE&HFF41,4:POKE&HFF41,0
1910 NEXT
```

Listing 2: ZEROBUF

```
00100 ***      ZEROBUF/ASM       ***
00110 *** PROGRAM TO ZERO OUT ***
00120 ***   THE DRAW BUFFER    ***
00130 ***      WRITTEN BY      ***
00140 ***   DENNIS H. WEIDE    ***
00150
00160
00170
00180
00190 BUFFER  EQU     $3D00
00200 ENDBUF  EQU     $7CFF
00210
00220
00230         ORG     $3BB0
00231
00232
00233
00240         CLRA            SET AREG TO ZERO
00250         LDX     #BUFFER GET START ADDR OF BUFFER
00260 LOOP    STA     ,X+     ZERO BUFFER OUT
00270         CMPX    #ENDBUF IS THIS END OF BUFFER?
00280         BLE     LOOP    IF NO-BRANCH TO LOOP
00290         RTS             IF YES-RETURN TO BASIC
00300         END
```

Listing 3: MOVESRAM

```
00100 ***    MOVESRAM/ASM    ***
00110 ***  PROGRAM TO MOVE   ***
00120 ***  SRAM MEMORY TO    ***
00130 ***    DRAM BUFFER     ***
00140 ***    WRITTEN BY      ***
00150 ***  DENNIS H. WEIDE   ***
00160
00170
00180
00190
00200         ORG     $3BC0
00210
00220
00230
00240 START   LDX     #$3D00  START OF DRAM BUFFER
00250         CLRA            ZERO AREG
00260         STA     $FF41   SET TRIGGER LOW
00270         LDA     $FF40   GET 1ST BYTE OF SRAM
00280         STA     ,X+     STORE IN 1ST BYTE OF DRAM
00290 LOOP    LDA     #$4     SET TRIGGER HIGH
00300         STA     $FF41
00310         CLRA            SET TRIGGER LOW
00320         STA     $FF41
00330         LDA     $FF40   GET NEXT SRAM BYTE
00340         STA     ,X+     STORE IT IN NEXT DRAM BYTE
00350         CMPX    #$7CFF  CHECK FOR LAST DRAM BYTE
00360         BLE     LOOP
00370         RTS
00380         END
```

PCM®

The *Premier* **P**ersonal **C**omputer **M**agazine for Tandy® Computer Users

Not only does Tandy produce our favorite CoCo, we think it produces the best portable and MS-DOS computers as well. We've found that when satisfied Color Computer users decide to add portability or MS-DOS to their computing habits, many stick with Tandy. For these people we publish PCM, The *Premier* Personal Computer Magazine for Tandy Computer Users.

Each month in PCM, you'll find information and programs for the Tandy 100, 102 and 200 portable computers. And you'll find even more coverage for Tandy's MS-DOS machines — from the graphics of the 1000 to the power of the 5000.

PROGRAMS AND PROGRAM DISKS!

We learned from THE RAINBOW that readers want programs to type in, so each month we bring you an assortment of them: games, utilities, graphics, and home and business applications. For those who don't have time to type in listings, we offer a companion disk with all the programs from the magazine. Also included in PCM each month is the *Software Shopper*, an "onmail" database service from which you can order the latest shareware products from our Delphi databases for Tandy MS-DOS and PC users — even if you don't have a modem!

TUTORIALS AND PRODUCT REVIEWS!

As if all this weren't enough, we offer regular tutorials on *DeskMate*, telecommunications and hardware; assembly language, BASIC and PASCAL programming tips; and in-depth reviews of the new software, peripherals and services as they are released. Add it all up and we think you'll find PCM to be the most informative and fun magazine for this market today!

YES! Please send me a one year (12 issues) subscription to PCM for only $28.* A savings of 22% off the newsstand price.

Name ____________________
Address ____________________
City ____________________
State ____________________
ZIP ____________________

In order to hold down costs, we do not bill.
My check in the amount of ________ is enclosed.
Charge to my:
☐ VISA ☐ MasterCard ☐ American Express
Acct. # ____________________
Exp. Date ____ Signature ________________

To order by phone (credit card orders only) call 800-847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

* Canadian subscribers U.S. $38. Surface rate elsewhere $64, airmail $85. Allow 6 to 8 weeks for first copy. Kentucky residents add 5% sales tax. U.S. currency *only*, please.

Mail to: PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

Note that the R/*W lead (Trace B) goes low. At the same time, the address bits A0 and A1 (traces D and E) are low and data bits D0, D1 and D2 (traces F, G, H) are high. These are the correct lead states for Address $FF40 and a data value of 255. Test lead C was connected to the E clock lead and should show a square wave pattern throughout the 16,384 timeslots. You can continue to test the analyzer by changing the values of the data and address. Editing Line 20 of the test program in CoCo B allows you to change the screen display and verify the test data.

Example:

```
20 DATA 86,FF,B7,FF,40,20,F9 'WR
ITES 255 DEC. TO $FF40
20 DATA 86,00,B7,FF,40,20,F9 'WR
ITES 0 DEC. TO $FF40
20 DATA 86,00,B7,FF,41,20,F9 'WR
ITES 0 DEC. TO $FF41
```

Analyzer Errors

Because the analyzer is a simple test set, it should not be considered highly accurate. When data is collected in the analyzer SRAM, the memory is constantly enabled so data can be written into SRAM during the entire clock cycle. Since data leads may be in the high-to-low or low-to-high transition state in the middle of the clock cycle, data states may be incorrect for a single timeslot. This can be seen when looking at the E clock (Trace C) signal. It doesn't always appear to be symmetrical, even though it is. A higher analyzer clock speed reduces the amount of such an error. Overall, however, I think the accuracy of the Digital Logic Analyzer more than meets the requirements for designing and testing CoCo applications and other low-speed TTL circuits.

And Finally

While the analyzer may not be an appropriate piece of test equipment for testing the multi-million dollar computers on the space shuttle Discovery, it is useful for most low-speed logic circuit testing you may have to do. By adding an additional CMOS buffer to the input circuit, the analyzer can be used for CMOS testing as well.

I'm sure a lot of you will find this project too complicated for your current skill levels. Why not set this article aside until such time that you have gained the necessary knowledge and skills to understand and build this project?

❑

Listing 4: FACTOR

```
00100 ***        FACTOR/ASM       ***
00110 *** PROGRAM TO FIND WHICH ***
00120 ***  MEMORY BITS ARE SET   ***
00130 *** AND STORE RESULTS IN  ***
00140 ***  BUFFER FOR GRAPHICS  ***
00150 ***         PROGRAM        ***
00160 ***       WRITTEN BY       ***
00170 ***    DENNIS H. WEIDE     ***
00180
00190
00200 BUFFER  EQU     $3C00
00210 BUFEND  EQU     BUFFER+$EF
00220 FACTOR  EQU     $3BAD
00230 TIMSLT  EQU     $3BAE
00240
00250
00260         ORG     $3BE6
00261
00262
00263
00270 START   LDX     TIMSLT  GET TIMESLOT FROM BASIC
00280         LDY     #BUFFER GET START OF DRAM BUFFER
00290 LOOP    LDA     FACTOR  GET POWER OF 2 FROM BASIC
00300         ANDA    ,X+     DETERMINE IF THIS
00310         STA     ,Y+     BIT IS SET AND SAVE RESULTS
00320         CMPY    #BUFEND IS THIS END OF BUFFER?
00330         BLE     LOOP
00340         RTS
00350         END
```

Listing 5: TESTBAS

```
0 ' COPYRIGHT 1990 FALSOFT, INC
1 'BASIC ANALYZER TEST PROGRAM
2 'BY DENNIS H. WEIDE
3 '
10 CLEAR 200,16000
20 DATA 86,FF,B7,FF,40,20,F9
30 FOR X=16384 TO 16390
40 READ A$:A$="&H"+A$
50 POKE X,VAL(A$)
60 NEXT X
70 FOR X=1 TO 1000:NEXT X
80 EXEC 16384
```

Listing 6: TESTBIN

```
00100 *** ANALYZER TEST PROGRAM ***
00110 *** THIS PROGRAM LOOPS    ***
00120 *** THROUGH A ROUTINE TO  ***
00130 *** WRITE 255 TO ADDRESS  ***
00140 *** $FF40                 ***
00150 *** BY DENNIS H. WEIDE    ***
00160
00170
00180
00190         ORG     $4000    PROGRAM RAM LOCATION
00200 DATA    EQU     $FF40    ADDRESS TO WRITE
00210 START   LDA     #$FF     LOAD AREG WITH 255
00220         STA     DATA     STORE AREG AT $FF40
00230         BRA     START    LOOP AND DO AGAIN
00240         END
```

Education Notes

a, e, i, o, u

by Steve Blyn
Contributing Editor

This month's article presents a short program in game format that helps students review elements of phonics. The study of phonics is often dry and somewhat boring to many students, and using the computer is usually more fun than using paper and pencil. I have chosen to illustrate this program by having the student choose correct vowels and then decide whether they are long or short.

The program contains a series of sentences on a specific level. One word in each sentence has a missing letter represented by a dash. The student is first asked to type the vowel that belongs at the dash. The program does not proceed until this is answered correctly. Then the student is asked to indicate whether the vowel is long or short.

The program proceeds in this manner, randomly selecting from among the sentences keyed into the data statements. Each data statement has three components: the sentence, the correct vowel and an L or S to indicate whether the vowel is long or short. The sentences I used are on the third-grade level. You may want to use sentences from a different level or permit the students to write their own sentences for practice. There are 15 sentences in this program. You may add more by changing the value of `A` on Line 40 to the same amount as the number of sentences you want to work with.

I did not include any scoring in this program because I think most students will soon master all the questions. I did, however, include a small extra when correct answers are given. In addition to happy sounds, the screen alternates quickly several times between `SCREEN 0,1` and `SCREEN 0,0`. It is a quick way to add a little pizazz.

Although vowels are the topic of our program, they are not the only phonic elements that can be reviewed. With relatively few modifications, selected initial consonants, blends or diagraphs can be the missing elements from your sentences. The question or questions need to be altered to reflect what is missing. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees, and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

16K Extended

100	3
180	132
270	119
330	43
END	13

Listing 1: `VOWELS`

```
10 REM"CHOOSING VOWEL SOUNDS"
20 REM "STEVE BLYN,COMPUTER ISLA
ND,STATEN ISLAND,NY,1990"
40 A=15:DIM A$(A),B$(A),C$(A)
50 FOR B= 1 TO A:READ A$(B),B$(B
),C$(B):NEXT B
60 CLS5:PLAY"O4L70GEGFEDC":RR=RN
D(-TIMER):R=RND(A)
70 FOR N= 1 TO 3:PRINT@37,"choos
ing vowel sounds";
80 PRINT@96,A$(R):NEXT N
90 PRINT@198,"which vowel is it
?";
100 PRINT@262,"PRESS a,e,i,o OR
u ";
110 EN$=INKEY$
120 IF EN$="A" OR EN$="E" OR EN$
="I" OR EN$="O" OR EN$="U" THEN
140
130 IF EN$="" THEN 110
140 SOUND 100,1:IF EN$=B$(R) THE
N 150 ELSE 110
150 PLAY"O4L30CEDCEDDD":GOSUB 26
0
160 PRINT@323,"IS THE ";B$(R);"
lONG OR sHORT ?";
170 EN$=INKEY$
180 IF EN$="L" OR EN$="S" THEN 2
00
190 IF EN$="" THEN 160
200 IF EN$=C$(R) THEN PLAY"L70GF
EDCCC" ELSE SOUND 10,2:GOTO 160
210 GOSUB 260:PRINT@384,STRING$(
32,255);
220 PRINT@448,"press ENTER to go
 on or E to end";
230 EN$=INKEY$
240 IF EN$=CHR$(13) THEN 60 ELSE
 IF EN$="E" THEN 250 ELSE 230
250 CLS:END
260 FOR T=1TO500:NEXT T:SCREEN0,
1:FOR T=1TO100:SCREEN0,0:SCREEN0
,1:NEXT T
270 FORT=1TO3:SOUND1,1:NEXT T:SC
REEN 0:RETURN
280 DATA I ASKED THEM TO STAY FO
R D-NNER ON FRIDAY..,I,S
290 DATA HIS MOTHER ASKED HIM TO
 BUY H-R SOME MILK.,E,S
300 DATA HER GRANDFATHER BOB C-M
E TO THISCOUNTRY FROM ENGLAND.,A
,L
310 DATA MANY PEOPLE WENT TO SEE
 THEIR   CHERRY TR-ES IN BLOOM.,
E,L
320 DATA WE VISITED THE Z00 ON A
 CL-SS   TRIP LAST SPRING.,A,S
330 DATA THE TEACHER READ TO -S
A STORY  ABOUT GIANTS.,U,S
340 DATA PAPER CAN BE M-DE FROM
WOOD AND RAGS.,A,L
350 DATA ONE POLICEMAN WR-TE A N
OTE TO   THE OTHER.,O,L
360 DATA NEW YORK IS A CITY ON T
HAT M-P  ON THE WALL.,A,S
370 DATA ONE GOOD H-LIDAY IN NOV
EMBER IS THANKSGIVING.,O,S
380 DATA MY LITTLE D-G IS VERY S
MART AND VERY CUTE TOO.,O,S
390 DATA I BIT INTO A N-T AND IT
 HURT MY TEETH A LOT.,U,S
400 DATA THE RAILROAD STATION IS
 ON THE  OTHER S-DE OF OUR TOWN.
,I,L
410 DATA THE HOUSE IS B-TWEEN A
LARGE ANDA SMALL TREE.,E,L
420 DATA YOUR MOTHER WANT-D YOU
TO COME  HOME AT 5:00 TODAY.,E,S
```

BASIC Training

Go Forth and Create!

by Joseph Kolar
Contributing Editor

During this session you will be shown a few new ideas and concepts, offered hints, given a good working program that can be used as a guide to create whatever design you envision, and encouraged to go forth and create.

Time's a-wasting. You have two options: If you are impatient, type in the listing and run it, or if you want to explore this together, type in lines 9 through 280 of Listing 1. This segment of the program creates a peculiar sample design. Please understand that the design element is an entirely random choice. You will be surprised at how it develops within a few minutes.

Mask Line 101 with a `REM`. The crosshairs in Line 102 allow us to see in which quadrants a design unit resides and how it evolves around a point (128,96). We will examine the `A0` presentation only. There are various ways to do this. One way is to retype Line 220, which causes the rotation, by typing `A=0` and deleting `,A` from the end of Line 260, destroying the loop. This is a pain in the neck. Now run the program and restore the lines to the original condition when you are finished.

Another way is to change the 3 to 0 in Line 220. `FOR A=0 TO 0` effectively becomes `A=0` because the loop allows no other possibility. Yet it is an operational loop. Unmask Line 101 and run the program. Let's study this design unit. It is a surprise to find that most of the design is in the fourth quadrant (upper left region), and the balance is in the first quadrant (upper right region). An interesting point is that we have three nicely delineated triangles, but there is one annoying line in Quadrant 1 that stands out like a sore thumb.

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

Return Line 220 to its former state, then run the program. The line in Quadrant 1 is irritating and serves no purpose. Use your graph paper to create the design element `A$`. It reveals why most of the design resides in Quadrant 4. It also reveals the offending line, `G3` in Line 100 of the program. If we made it invisible, would the integrity of the design unit hold up? To make `G3` invisible, all we need do is insert a `B` in front of `G3`. Make the insertion and run the program.

If we add `D3` to Line 100, we can close up those loose lines to make it a bounded triangle. If you consult your sketch, you see that it has to be `D6H3`. Do you see how easy it is to run off target?

Restore Line 100 to its original state. I thought, "What would happen if I began Line 100 with `BL3`?" `D6` was added at the end because the open wing bugged me. Another interesting design resulted. Try it!

The next idea I had was to remove `D6`, change `BL3` to `BH3`, and see what happened. Make the changes in Line 100, then run the program. Now that has possibilities! The clue is that the design is too large. The furthest line of the wing is distorted in both the second and forth quadrants. Notice the two glitches. We discovered in a previous tutorial that when the CoCo draws a line that runs off screen, it does the best it can and moves to the right at the top border until it reaches the required length `E3` (in this case, 44 spaces long). Then it connects the two ends of the line.

One way to eliminate the glitches requires that the design be made smaller. In lines 230 and 105, change 44 to 40, then run the program. Why not make it more distinct by changing the steps to `-2` in Line 105 and `2` in Line 230? Then run the program to see the result.

Unmask Line 270 and mask Line 280 if you feel like it. I call this Swazicross.

If you want to fool around, add `D6` at the end of Line 100. Then run the program. Now remove `STEP 2` from Line 230 and change `-2` to `-1` in Line 105 and run the program. It looks even nicer if you remove `D6` from the end of Line 100. Now change `BH3` to `BR4` and run the program. I call this Wildflower.

Do you see how easy it is to get caught up in a creative frenzy? You may want to stop this tutorial and work late into the night making variations of a theme.

When you are ready to resume, mask Line 270 and unmask Line 280. Edit Line 230 to read `FOR S=4 TO 40 STEP 2` and Line 105 to read `FOR S=40 TO 4 STEP-2`. Before you restore Line 100, run the program. Now that's a flower! A bee would go nuts if he came across such a wonder. Change `BR4` to `BH3` in Line 100. This is the final demo that evolved before I staggered down the primrose detour.

If you want to get a different, slower effect when removing the design, change `-2` in Line 105 to `-1`. This sweep also stops between each visible line, drawn by `STEP +2` of Line 230, and sweeps up sweet nothings. Now run the program. To use the gimmick effectively, divide whatever `STEP` value you have in the On line by two and use that value. If the result is not a whole number, use the next lowest whole number. On the other hand, some leftover residue might be desirable on the Off screen. Do not hesitate to try other values that may partially clear the screen and leave a nice residual pattern.

Back to the drawing board!

Type in Line 5 (unmasked), lines 500, 510, 520 (unmasked) and 529 through 533. At this stage we are only concerned with the first design unit and whatever quadrants it occupies.

Mask Line 100. Restore Line 105 and 230 as in Listing 1, then run the program. We see the `A0` option of an old friend, `A$`, from the last tutorial. Note that it is equally divided between quadrants 1 and 2. After the first go-around the cross-hairs fall away.

When you have finished looking, unmask Line 521 and 532 so only the `A0` design unit is exposed. It is not noteworthy so we unmask Line 532 to check it out in its entirety. Now run the program. Unmask lines 522 and 532 and run the program. Then mask Line 532 and run the program.

Unmask lines 523 and 532 and run the program again. This is the first example where we encounter the `M` movement option. The sharp point gives the game away because we know we can't generate such an acute point using `E` and `F`. Mask Line 532 and run the program. In `SCREEN1,1`, the horizontal spear tips tend toward blue and yellow while the vertical tips tend toward red and blue. This seems to be the nature of the beast. I have observed that lines drawn in a horizontal direction lean toward blue and yellow and green. Lines drawn in a vertical direction tend to be another shade of blue, while lines drawn diagonally tend to be a pinkish color.

An unusual arrowhead design is created if `BL3` is inserted at the beginning of Line 523. Try it and run the program. Now change `BL3` to `BL6`. Can you guess what you've drawn? Run the program. You really have arrowheads. If you had plotted out the design on graph paper, you would count the horizontal length, 6. Thus, if you jump left six spaces, the CoCo must begin at the tip of the arrowhead. Let's change `BL6` to `BL9` and run the progam. What will be drawn? It looks like jewel-encrusted daggers. Notice how the design drifted so it is balanced between the third and fourth quadrants. The design began at (125,96) because we jumped three spaces past the end of the design. Thus the visible part of `A$` is created in a left direction along the horizontal plane.

Suppose we changed `BL9` to `BR9`. What would be drawn? Are you sure? Run the program and watch the arrows as they hurtle to the edge of the screen and crash. `BR5` crashes the two vertical ones. Just for meanness, add a rock to the end of Line 523, `+"BE4EFGH"` with predictable crash. But it looks neat.

Here is a really unusual concoction: Add to the end of Line 523 `+"BH4EFGH"` and watch the second rock change direction. Then run the program. It's great! I think the

TAKE CONTROL OF YOUR OS9 LvII COLOR COMPUTER

< < INTRODUCING > >

Pt - FILE MANAGER - *19.95*

Pt is a complete file management utility. Pt consists of 13 utilities for file management and 7 utilities for directory manipulation. All operate from within a point and shoot environment. Pt allows you to add point and shoot file selection to all your command line based programs. When started Pt displays a directory of the current data directory, with a cursor highlighting a file name. The cursor moves by using the arrow keys. Simply highlight a filename and press F to display the file manipulation menu or D to display the directory menu. A command can be entered and the highlighted file used as a parameter by pressing enter. Adds many new capabilities not realized in current OS9 utilities. Ideal for both hard-disk and floppy based systems.

S-SCREEN CONTROL UTILITY - *19.95*

Gives complete control of your text screen in only 510 bytes. 34 built in mnemonic commands give simple command line control of your screen. Merge S into your shell and forget display codes forever.

M-MENUING UTILITY - *19.99*

Create complete menuing systems for your OS9 LvII color computer using simple ascii text files. M merges into your shell for a memory resident menuing system.

ALL PROGRAMS 100 % MACHINE LANGUAGE
MULTI-VUE NOT REQUIRED.

r3 Systems Consultants (602) 745-2327
4072 E 22nd Suite #178
Tucson, Az 85711

Az Residents add 7% sales tax.
Please add $3.00 shipping and handling
Checks, Money Orders or C.O.D. orders accepted.

1989 COCO FEDERAL TAX
by PURITAS SPRINGS SOFTWARE

In his review of the 1987 edition, Ted Paul wrote: *"This is an excellent program and manual and I was in awe when the mail carrier handed me this huge bundle."* **COCO ClipBoard Magazine, Mar/Apr 1988.**

***THE ultimate tax preparation package, *100 + page manual *64K CoCo 1, 2 or 3 w/disk drive, *3 diskettes, *menu driven, *loads & saves files to disk, *prints to screen and/or prepares forms acceptable to IRS, *format & organization follows IRS forms, *built-in calculator, *self-checking for common errors and omissions, *simple yet extensive file editing features, *disk directory function.** **Price-$39.95.*

Includes: Form 1040; Schedules A, B, C, D, E, SE; Forms 2106, 2441, 4562, 8615; and State/Local Tax, Pension/Annuity, Social Security, IRA worksheets and more.

DELUXE ICON EDITOR

"A Must For Multi-Vue" **wrote Barry Pottinger in his Feb. 1989 Rainbow Review. 100% m/1, 512K CoCo3 required. Allows complete creation and revision of Multi-Vue's application and icon bit map files.** *A bargain at $10.95.*

softWAR Technologies

IRONSIDES & CRIMSON SAILS

A two player naval game for the 512K CoCo3 running OS9 Level 2. Utilizes 640x192 high resolution screen. Comes on a single disk containing 5 different naval battles. I&CS is really 5 games in one. Different game maps with different set-ups requiring different aspects of play. I&CS can load or save games in progress.

I&CS is only $8.95. **Reviewer Ted Paul called it** *"a steal at this price. Not only are the graphics good, but the game is too."* **Computer Shopper, 11/88. Also see Rainbow Review, 4/89.**

Ameritrust Building
17140 Lorain Avenue
Cleveland, Ohio 44111
(216) 251-8085

first rock bouncing off the wall deflected the path of the second rock.

You should want to investigate this case. Reduce the size until all the design units are undistorted, then increase the size to see what happens as the arrow and rocks slam into the wall.

Unmask Lines 524 and 532, then run the program. This design is loaded with `M` options. Did you sketch it out? Mask Line 532 and run the program. Add `BR` inside the quote before `M+4` at the beginning of Line 524, and change Line 220 `FOR A=0 TO 2 STEP2` and Line 104 `FOR A=2 TO 0 STEP-2` to get a kissing gourami fish. Then run the program. Restore lines 220, 104 and 524 to their original state.

Unmask lines 532 and 525, then run the program. Mask 532 and run the program. If you plot this one out and are confused, you can see it develop best in `SCREEN1,0`. This mish-mash design doesn't seem to have any redeeming features.

Remove `BR2` from Line 525 and run the program. This is an example of a design unit in all four quadrants.

Unmask lines 526 and 532 and run the program. This one looks full of possibilities. Mask 532 and run the program. Note that the design crashed along the vertical axis. Watch it a few times and you can see it hit the wall and bend, searching for room to get out of its confinement.

Remove `BR` from Line 526 and run the program. There is still a slight bump. Insert `BD` in Line 526 and run the program. This looks as if it just skidded to a halt in time. The design is too bulky. Either `A$` should be redrawn or Size 44 and maybe Size 40 should be discarded in lines 105, 230 and 529. We must learn to not be too ambitious.

Unmask lines 532 and 527 and run the program again. Mask 532, then run the program. This is an example of an overly complex design. It has so many points of interest that it is overpowering. Try not to go to extremes in your enthusiasm.

Extract `BR` from Line 527, then run the program. It is within the bounds of sensibility and is acceptable. Now if you insert `BR2` and run the program, it looks like four bugs in a spider's nest. Change `BR2` to `BR3`, then run the program. It *really* looks like bugs in a spiderweb. Try `BL3`. If you use `BL6`, it looks like Dracula rising from his coffin.

Unmask lines 528 and 532 and run the program. Mask Line 532, then run the program. This design is massive and overwhelms the screen. Here is a trick to make it a bit smaller, but it alters the design. Insert `N` as the first character in Line 528. Now run the program. If you sketched this design on graph paper, here is an exercise to try. Keep advancing `N`, one character at a time, in Line 28. Guess what effect it has and check it out. Advance `N` until it falls in front of the first `M` in Line 528. Did you anticipate this design?

Mask Line 5 and unmask lines 6, 600 and 620. Then run the program. Thus far, we have been concerned with design units that go in the four directions — up, down, left and right. Now we will consider those that run along the diagonal. If you extended a line along the line that points out its direction, you can see that it reaches the top border at (128+96,0) instead of (255,0).

Edit Line 610 and press ENTER. Type `24`, press the space bar, type `I` followed by `N`, press the up arrow and SHIFT keys together, then the space bar until the cursor is under " and type `H` followed by `E128"`. Then press ENTER and run the program. This is the ideal direction.

To Line 610, add `:LINE (224,0)-(128,96),PSET`, then run the program. This is the line along which the diagonal lines build. The trick is to move the diagonal line so it heads to 255,0. Mask Line 632 and run the program. We can move `A$` in Line 620 to advance along this desired line if we insert `BR` at the beginning. But we modify the heart of the design unit. Unmask Line 632 and run the program. Let's see how it looks in all `A` options. Mask Line 632 and run the program. The design is tipped to the right.

There is a trade-off. We can move the design in the desired diagonal direction but sacrifice part of the design. Often the trade-off is acceptable. Here is "Escape of the Design's Soul." First Mask Line 610, and in Line 630 change `96` to `X` so we can use the `X` values in Line 629, both to move and change the design. Then run the program.

Unmask Lines 632, 610 and 621. Change `X` to `96` in Line 630 and run the program. If we introduce `BR` at the beginning of Line 621, the design units become equidistant, (the ideal attitude). The design is altered but not too significantly, and the tilt to the right does not assault our artistic taste and sensibilities.

You might comment that this is a failed experiment if you mindlessly run from one display to the next. But if you stop to study each presentation, it is a new ball of wax.

A final thought on some of the by-ways you will travel in CoColand: You will evoke an occasional design that is so unique that it has never been seen by a human eye in all eternity. After you kill it, it may never be duplicated in the future.

❑

16K Extended

115	137
500	183
528	97
END	127

The Listing: `WINDMILL`

```
0 'LISTING1
5 'GOTO500'ON THE LINE
6 'GOTO600'ON THE BIAS
9 T=RND(2): ON T GOTO10,11
10 PMODE4,1:PCLS:SCREEN1,0:GOTO1
00
11 PMODE4,1:PCLS:SCREEN1,1
100 A$="U3R3G3L3U3E3"
101 GOTO220
102 DRAW"BM0,96R128NR128ND96U96"
:GOTO220
104 FOR A=3 TO 0 STEP-1
105 FOR S= 44 TO 4 STEP -4
110 B$="S"+STR$(S)
115 D$="A"+STR$(A)
120 DRAW "C4BM128,96"+D$+B$+A$
130 NEXT S,A
200 FOR Z= 1 TO 200:NEXT
205 PCLS:GOTO 9
220 FOR A= 0 TO 3
230 FOR S= 4 TO 44 STEP4
240 B$="S"+STR$(S):D$="A"+STR$(A
)
250 DRAW"BM128,96"+D$+B$+A$
260 NEXT S,A
270 'FOR Z= 1 TO 2000: NEXT:PCLS
:GOTO 9
280 FOR Z= 1 TO 600:NEXT:GOTO 10
4
500 PMODE4,1:PCLS:SCREEN1,1
510 DRAW"BM128,96NL128NR128NU96D
96"
520 'A$="EFRE2F2G2H2LGH"
521 'A$="E2F2REFGHLG2H2"
522 'A$="EFE2F2EFGHG2H2GH"
523 'A$="EFEM+3,1M-3,1HGH"
524 'A$="M+4,-2R2M-1,2M+3,-1FGM-
3,-1M+1,2L2M-4,-2"
525 'A$="BR2U2H2M+6,2G2GHL4F2M-6
,2E2U2BL2"
526 'A$="BRHM+1,-2M+6,2NM-3,1M+3
,1M-3,1NM-3,-1M-6,2M-1,-2EBL"
527 'A$="BRUHM+2,-1BD2R3FGL3BD2M
-2,-1EUBR"
528 'A$="REFERULDRM+4,1M-4,1LDRU
LHGHL"
529 FOR X=4 TO 44 STEP4
530 DRAW"S=X;BM128,96"+A$
531 NEXT X:FOR Z=1TO2000:NEXT
532 GOTO532
533 GOTO100
600 'PMODE4,1:PCLS:SCREEN1,1
610 DRAW"BM0,96R128NR128NU96D96"
620 'A$="UREU2R2D2L2GDL"
621 'A$="EU2RU2FRDFL2DL2G"
629 FOR X=44 TO 4 STEP-4
630 DRAW"S=X;BM128,96"+A$
631 NEXT X:FORZ=1TO2000:NEXT
632 GOTO632
633 GOTO100
```

BEST PUBLIC DOMAIN PROGRAMS !

FROM T&D SUBSCRIPTION SOFTWARE

"Great service and great software"
Jim Garner
Ft. Worth, Tx

"Your programs are the greatest!"
Christine Rapoza
Tiverton, RI

T&D SUBSCRIPTION SOFTWARE HAS ACCUMULATED OVER 1.000 PUBLIC DOMAIN PROGRAMS FOR THE COLOR COMPUTER.

WE ARE SELLING 630 OF THE BEST. JUST THE GOOD STUFF !

Music 1-7

M1 - 8 Utilities & 8 Songs
M2 - 17 Musica Files
M3 - 16 Musica Files
M4 - 16 Musica Files
(M2 – M4: Requires Musica)
M5 - 25 Orchestra Files
M6 - 23 .Bin Files Ready To Run
M7 - 23 .Bin Files Ready To Run

ADVENTURES 1,2

Each Disk/Tape Contains
9 Great Adventures
Ready To Run

Order A1 Or A2

TELECOMMUNICATIONS 1-3

T1 - Haysae, Kermit, Mikeyterm, TeleTerm
T2 - Cobbs BBs Terminal Package
T3 - GETERM Communications

RAINBOW
CERTIFICATION
SEAL

GRAPHICS 1-14

GR1 - 12 Basic Graphic Programs
GR2 - 12 Basic Graphic Programs
GR3 - 9 Coco 3 Graphic Programs
GR4 - 22 Coco Max Pictures
GR5 - 22 Coco Max Pictures
GR6 - 22 Coco Max Pictures
GR7 - 15 Coco Max Pictures
GR8 - 22 .Bin Pictures
GR9 - 22 .Bin Pictures
GR10 - 14 Large .Bin Pictures
GR11 - 8 Mge Pictures
GR12 - Coco Max 3 Pictures
GR13 - Macpaint Graphic Editor
GR14 - 5 Macintosh Pictures

•• See Our Ad Containing 250 Graphic Pictures Elsewhere In This Magazine

EDUCATION 1-4

E1 - 12 Programs For Young Kids
E2 - 12 Programs For High School Kids
E3 - 11 Programs Teaching The Coco'S Commands
E4 - 5 Graphics Programs About Australia

HOME MANAGEMENT 1-4

• 12 Programs Each Disk/Tape •

H1 - Bargraph, Calendar, Financial Advice, +
H2 - Charts, Last Will, Planets, +
H3 - Finance, Stocks, Typing, +
H4 - Spelling Fix, Spelling Checker, +

GAMES 1-11

• Each Disk/Tape Contains 12 Programs •

GA1 - CarRace, Horses, RoBo Dice, StarTrek, +
GA2 - BoBo, Chess, Rubic, Yahtzee, +
GA3 - Backgammon, Gremlin, Python, Robots, +
GA4 - Hawks, Saucer, Shootem, Trek, +
GA5 - Batlship, Chicken, Raceway, Squash, +
GA6 - Fly, Navy Guns, ShipSub, Tanks, +
GA7 - Connect4, F-16, Pizza, Trek, +
GA8 - Football, Leaky Tap, Poker, SubHunt, +
GA9 - Battle, Chick, Flight, Prix, +
GA10 - Blockade, Fly, Missile2, Pong, +
GA11 - Bunker3, Guadal, Martians, Traders, +

UTILITIES 1-8

• 12 Programs Each, 1-4 Require Disk •

U1 - Dir32, DiskZapper, RomCopy, Snap Edit, +
U2 - Backup, Diskfix, Labeler, Multback, +
U3 - Convert ML, MLdata, PlayMac, SendDisk, +
U4 - Bin>Bas, PixConv, Unarc, VuMaster, +
U5 - Assemblr, Graph, McBase, Recover, +
U6 - Clock, Llist 32, , MiniDos, Pixcomp, +
U7 - Head Print With 30 Mini Pictures
U8 - Fig Forth Language With Tutiorial

BUY ALL 53 DISKS/TAPES FOR ONLY $145.00 !

MAIL TO:
T&D Subscription Software
2490 Miles Standish Drive
Holland, Michigan 49424
(616) 399-9648

Call or write for a FREE catalog !

PRICES:
1- 5 disks/tapes....$6.00 each
6 or more..............$5.00 each
All 53 disks/tapes $145.00

VISA MasterCard

• WE SEND 1ST CLASS - NO CHARGE •

• PERSONAL CHECKS WELCOME •

Name____________________

Address____________________

City__________ State_____ Zip________

Credit Card #____________________

Expires____________________

TOTAL AMOUNT $____________________

CIRCLE ISSUES DESIRED

M1	GR1	E1	U1	GA1
M2	GR2	E2	U2	GA2
M3	GR3	E3	U3	GA3
M4	GR4	E4	U4	GA4
M5	GR5		U5	GA5
M6	GR6	H1	U6	GA6
M7	GR7	H2	U7	GA7
	GR8	H3	U8	GA8
A1	GR9	H4		GA9
A2	GR10			GA10
	GR11			GA11
T1	GR12			
T2	GR13			
T3	GR14			

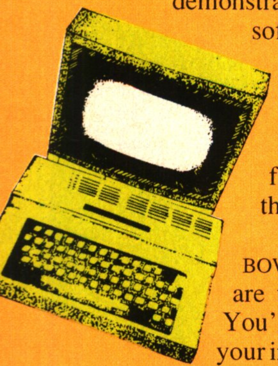
PLEASE CIRCLE
TAPE **DISK**

Please turn to pages 23 & 57 for our Subscription Software!

RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products** for **the first time. Chicago, Illinois is the show** to get information on capabilities for the CoCo, along with a terrific selection of the latest CoCo software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.



Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo— from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW—as well as those who are written about— are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

As an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Somerset, New Jersey, why don't you make plans now to join us in Chicago, Illinois? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The The Hyatt Regency Woodfield — Schaumburg, Illinois, offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — The CoCo Community Breakfast (separate ticket required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

FREE SEMINARS

Cray Augsburg
RAINBOW Managing Editor
Writing for Publication

Bill Daniels
Danosoft
Memory Methods for Large Programs

Kevin Darling
Independent Programmer
Advanced OS-9

Art Flexser
SpectroSystems
A Walk Through BASIC

Marty Goodman
RAINBOW Contributing Editor
2 CoCo Consultations

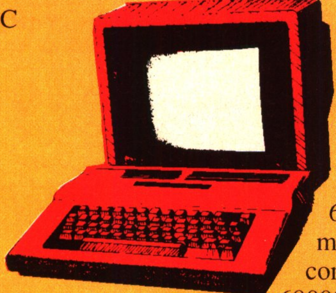
Marty Goodman & Guests
RAINBOW Contributing Editor
Inside Delphi

Cecil Houk
Rulaford Research
Musical Instrument Digital Interface (MIDI)

Greg Law
RAINBOW Technical Editor
OS-9 for Absolute Beginners

Jeff Noyle
Oblique Triad
Game Programming Forum

Dale Puckett
RAINBOW Contributing Editor
BASIC09



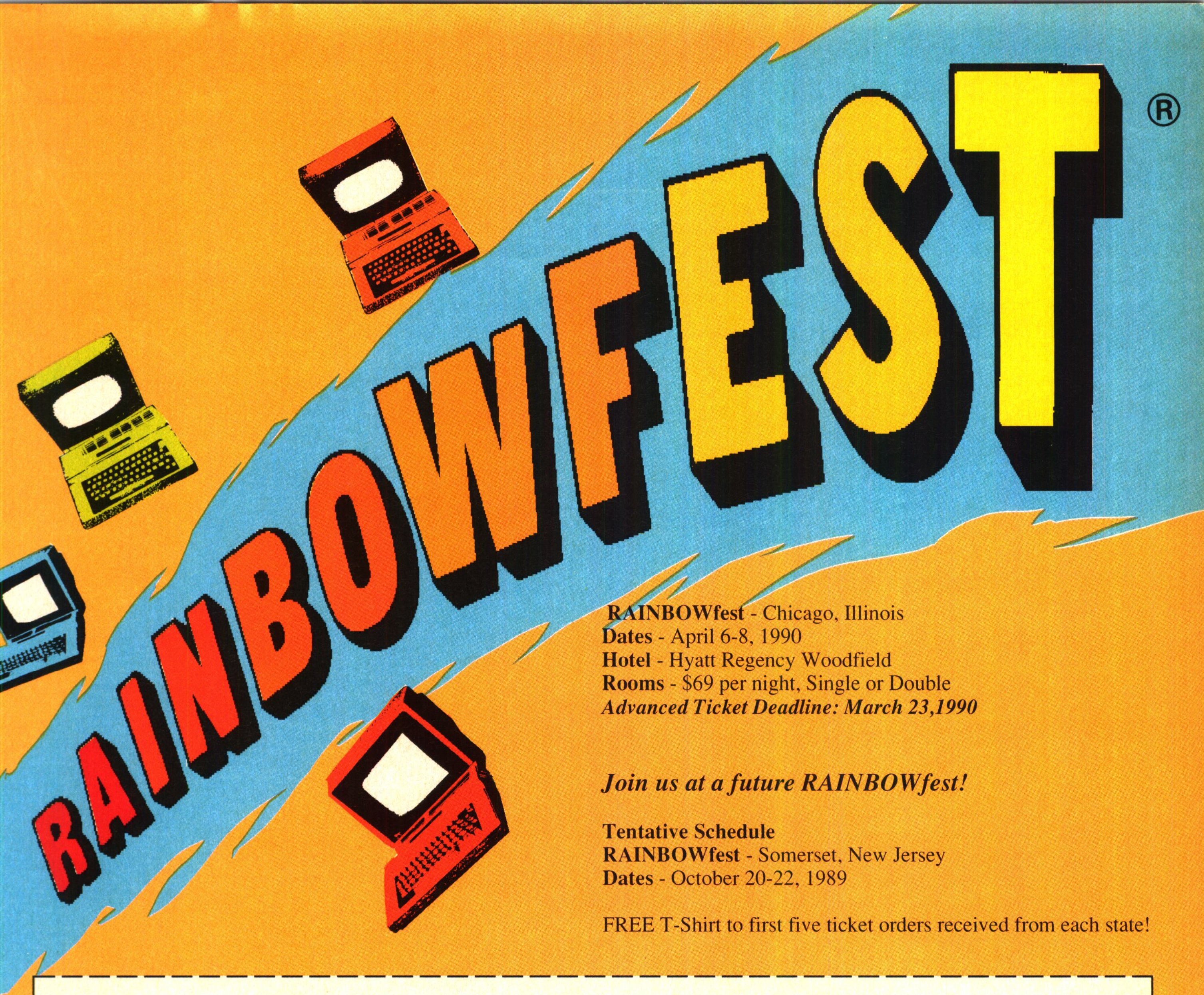
COCO COMMUNITY BREAKFAST

Frank Hogg — Key Note Speaker

Frank Hogg, entrepreneur, gives us insight into the future as we move progressively towards the 680x0 and OS9/68K. Frank's background, known well to RAINBOW readers, covers all the computers from the old WWTPC 6800 thru the CoCos to the 68030 based multi-megabyte QT computers he makes today. Frank's talk explores ways to bridge from the CoCo to the 680x0 computers with OS9/68000. He explores ways to run CoCo applications on OS9/68000 and the exciting possibility of running both a 6809 and 68000 in the same machine. Join Frank for this glimpse into the future.

Don't forget ...

If yours **is** one of the first 500 ticket orders, a coupon for a complimentary issue of The Third Rainbow Book of Adventures will be enclosed with your tickets — if yours is one of the first five orders received from your state, a coupon for a complimentary RAINBOWfest T-shirt will be enclosed with your tickets. So hurry up and place your order to take advantage of this offer.



RAINBOWfest - Chicago, Illinois
Dates - April 6-8, 1990
Hotel - Hyatt Regency Woodfield
Rooms - $69 per night, Single or Double
Advanced Ticket Deadline: March 23,1990

Join us at a future RAINBOWfest!

Tentative Schedule
RAINBOWfest - Somerset, New Jersey
Dates - October 20-22, 1989

FREE T-Shirt to first five ticket orders received from each state!

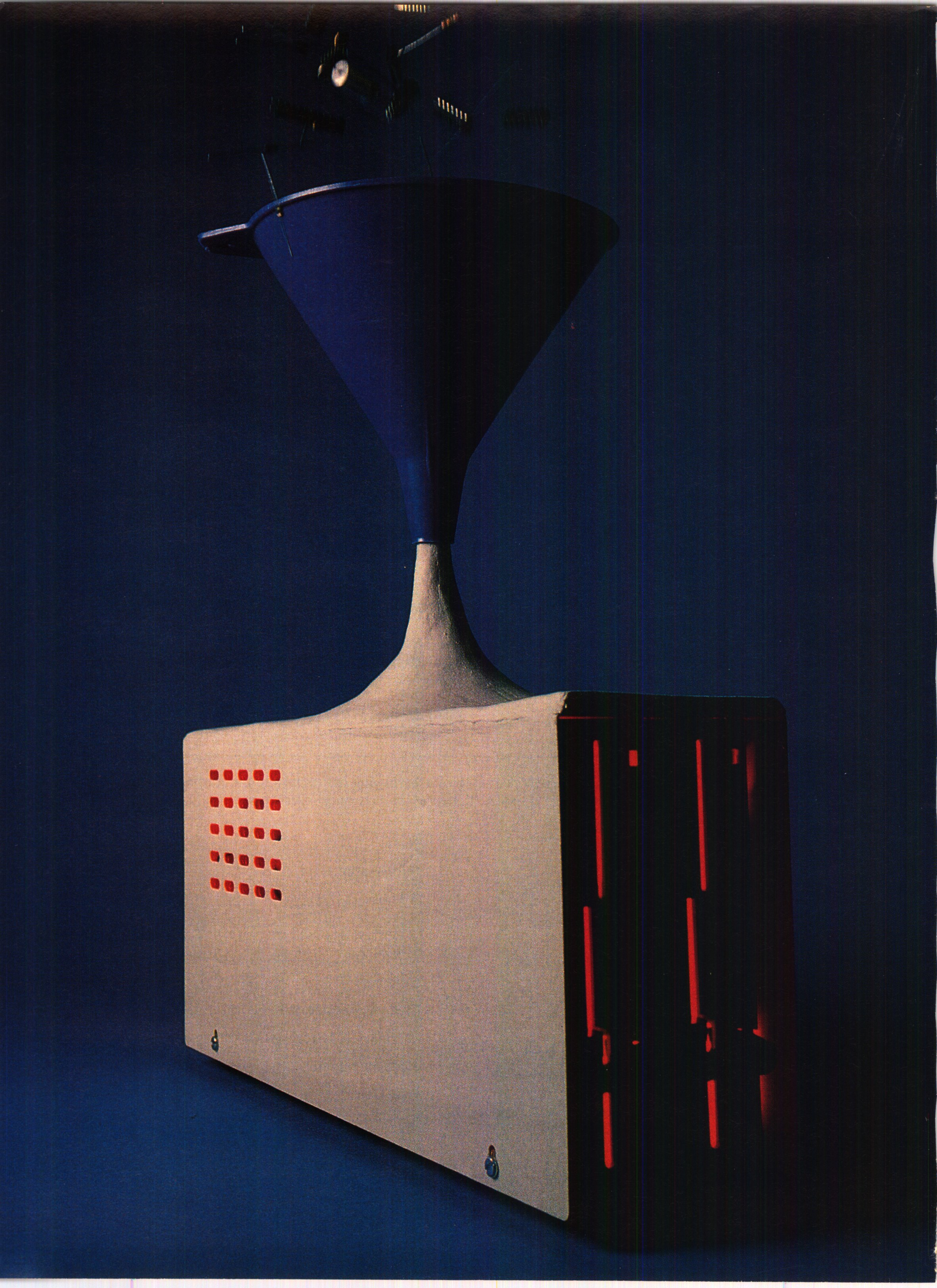
YES, I'm coming to **Chicago!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

_____ Three-day ticket(s) at $9 each total______
_____One-day ticket(s) at $7 each total ______
Circle one: Friday-Saturday-Sunday
_____ Saturday CoCo Breakfast
at $12 each total _____
_____ RAINBOWfest T-shirt(s)
at $6 each total _____
Specify size:
_____S _____M _____L _____XL
(T-shirts must be picked up at the door)
Handling Charge $1 $1.00
TOTAL ENCLOSED ________
(U.S. Currency Only, Please)
☐ Also send me a hotel reservation card for The Hyatt Regency Woodfield ($69, single/double room).

Name ____
(please print)
Address _____________________________________
City ____________________ State __________
Telephone _______________ ZIP ____________
Company _____________________________________
☐ Payment Enclosed
☐ VISA ☐ MasterCard ☐ American Express
Account Number _____________________________
Exp. Date __________________________________
Signature __________________________________

Advance ticket deadline: March 23, 1990. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: THE RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.



bersome to use. I figure if I have to call the shell 90 percent of the time I may as well work directly with the shell instead of having another program do it for me.

However, *M-Menu System* is a good value for the price. It is an excellent system for setting up a personalized menu system. If you're looking for a small, easy-to-use menu system under OS-9, this program fits the bill.

(r3 Systems, 4072 E. 22nd St., Suite 178, Tucson, AZ 85711, 602-745-2327; $19.95 plus $3 S/H)

—Jim Manning

Software 128K CoCo 3

Slam Bam—
Dunk It, Ma'am

Slam Bam lets the armchair athlete slam dunk a basketball without having to work up a sweat or even lace up the sneakers that have been sitting in the back of the closet since last summer's company picnic. This graphics game allows numerous ways to dunk a basketball including one- and two-handed dunks, normal and backhanded slams or the showoff-and-spin-360-degrees and stuff-that-sucker-through-the-hoop dunks. It is even possible to break the backboard — a goal in life I'm sure we all have. All these shots are carefully scrutinized by three judges whose accumulative ratings produce a point value for each successful dunk which are then displayed on a scoreboard.

The game comes with two pages of instructions — the weakest part of the package. Even disregarding the numerous typos and grammatical errors, it is difficult at best to decipher the author's intent. Therefore, the best way to get the hang of the game is through trial-and-error. For instance, to attempt a dunk coming down the middle, you would start with the joystick held to the right and press the 2 key. You then watch as the animated player approaches a line beneath the basket at which point you press the firebutton to make him jump. At the same time, move the joystick to the left. If the dunk is successful you see the ball drop through the basket, and then you receive a score from each of the three judges. If the shot is missed, the player returns to the foul line for the next shot.

To play, whether alone or against a human opponent, a 128K CoCo 3 (*not* a 512K CoCo 3) and a joystick are required. To really enjoy *Slam Bam*, however, you have to be a basketball glutton because the game only allows four shots in the Game mode and three shots in the Practice mode, after which the player has to sit through the cycling of the title screen, credits, opt for Solo or Two-player mode, choose to practice or play a game and enter his or her name again. This gets quite tedious after a short period of time. And even at a listed price of $10, this is not likely to be a game that you will return to play time after time.

(Erich Sweaney, P.O. Box 45434, Tacoma, WA 98445, 206-535-9733; $10)

—George Aftamonow

Software 512K CoCo 3

Big RAMDisk—
Big Things in Small Packages

Well, you did it. You got that 512K RAM upgrade you requested as a Christmas present, and now you're ashamed to admit that you only wanted it to see the nifty graphics in *Rogue*. Or that you'd like to learn OS-9 for its memory-usage capabilities but just haven't got the time to sit down with it. Take heart, Danosoft has what you're looking for.

Pre-Rainbowfest Sale.
We Pay Shipping Until April 6th!*

MULTI-FONT PRINTER
NX-1000II

Now a Blazing 180 characters per second!

The NX-1000II gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. The NX-1000 Rainbow gives you all these features plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange. Both models have a 1 year warranty and a 30 day online trial.

NX-1000II SPECS: 180 cps Draft, 42 cps NLQ (18 x 23 dot matrix), 4 NLQ Fonts, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable, Quad Tall, Double Tall, Underline, 9+ Pitchs, Forward and Reverse n/216" Line Feeds, Absolute or Relative Vert. & Horz. Tabs, Left, Center or Right Justification, 8 Graphics Modes to 1920 dpl, Macro Instruction, Bidirection, Adjustable Tractor Feed, 200+ Printable Characters, Semi Auto Sheet Feed, Front Panel Soft Touch Control, Epson and IBM Emulate, 4k Data Buffer, Hex Dump.
NX-1000 Rainbow: 144 cps Draft, 36 cps NLQ, rest same as NX-1000II plus color.

NX-1000II SYSTEM INCLUDES:
- Star NX-1000II Printer
- Blue Streak Ultima
- Software Support Trio

$208 88 +$10 Shipping PAID*
COMPLETE

NX-1000 RAINBOW SYSTEM INCLUDES:
- Star NX-1000 Colour Printer
- Blue Streak Ultima
- Software Trio
- Color Super Gemprint

$269 95 +$10 Shipping PAID*
COMPLETE

The Smallest, Sleekest, Fastest Serial To Parallel Converter You Can Buy!

7 Switchabel Baud Rates
300 • 600 • 1200 • 2400 •
4800 • 9600 • 19200

Use this "smart" cable to connect a Centronics parallel printer to any version CoCo or use it to improve performance of your current printer. The cables are long-life, high quality shielded cables with moulded plugs for extra durability.

Try a Blue Streak Ultima on your system for 30 days RISK FREE. One year warranty.

The Blue Streak Ultima

Powered version add $6.00.

$39 95 +$2 Shipping PAID*

FREE with purchase of any NX-1000 System

Software Support Trio

Type Selection/Tutorial
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.

Super Gemprint
Will transfer Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

Hi-Res Super Gemprint
Disk software that will transfer a Hscreen 1, 2, 3, or 4 picture screen to printer. Grey level shading for color.

FREE with purchase of any NX-1000 Printer

All Three Programs $19 95

Color Super Gemprint

Print your Graphics Screen in Color on your NX-1000 Rainbow!

Use your favorite program to create a pmode or hi-res graphic image, but don't stop there! Run our color graphics software and print a color image using a palette of 81+ colors on your NX-1000 Rainbow from a CoCo 1, 2, or 3. Requires 32k ECB Disk.

$19 95

FREE with purchase of any NX-1000 Rainbow System

Price, availability and specifications subject to change without notice.

Order Your System Today... Call (513) 885-5999

DAYTON ASSOCIATES of W.R. Hall, INC.
9644 Quailwood Trail • Spring Valley, Ohio 45370

Visa & Master accepted within the continental U.S.
Ohio residents add 6.5% sales tax
COD add $3.00

*Shipping paid only in Continental U.S. Normal shipping charges to Canada, P.R., HI, AK, APO, FPO are double. Triple charge to all other countries. These areas can take advantage of show special by deducting the continental U.S. shipping amount from their normal shipping costs. Offer expires April 6, 1990.

Last October at the RAINBOWfest in New Jersey, I had the pleasure of meeting Bill Daniels, the genius behind Danosoft. Judging from the titles of his software packages (*Big BASIC*, *Big Disk* and now *Big RAMDisk*), I had expected a large man with hands that barely fit on the keyboard (rather like myself). Instead Mr. Daniels resembles his work: compact and brilliant. He operates an accounting firm in Canada, so his software business is a second line. He is the only person I have met so far, however, who doesn't bother with an assembler when he writes machine-language programs: He has memorized most of the instruction codes and so types them directly into RAM, using Danosoft's *Memory Master*.

Big RAMDisk is not just another RAM disk program — it is a complete package in its own right, containing eight different configurations for most any assignment of drives, real or "imaginary." There are utilities to back up the physical drives to and from the RAM drives and to relocate the program in memory, should it interfere with some machine language application. It is also usable in combination with any of Danosoft's pantheon of *Big* utilities.

The program is a breeze to run. You decide which configuration to use based on two criteria: first, your DOS version, and second, which physical drives you want to use and how you want to number your RAM drives. Because I have Disk BASIC 2.1 and am using *Big Disk* from the utilities package, I have converted my physical drive to one 360K, 40-track Drive 0. I configured *Big RAMDisk* to "real" Drive 0, RAM Drive 1 by typing `LOADM"RAMDISK/113"`. Different configurations are made just by changing the extension. Then you can `DSKINI` the RAM drive just like any drive. A BASIC program supplied on the disk called `COPYDISK` will copy the entire disk from the physical drive to the RAM disk or vice versa. Since it is a GAT (Granule Allocation Table) backup, it is quite fast — it copies only the files it finds on the directory, instead of all 35, 40 or 80 tracks, used or not. The manual also states that this is a good way to optimize disk access speed because the program copies to the physical disk in the most economical order, so the files aren't scattered around on the disk.

If the RAM disk isn't fast enough for you (my word processor saves a three-granule file in less time than it takes me to realize it's done), you can use the high-speed poke, `POKE 65497,0`. While this can be disastrous with a physical drive ("Kids! Don't try this at home!"), it really blasts off with the RAM drive, which, being software, isn't affected by the slow reaction time of motors and controllers. No more waiting while the drive cranks and grinds to load and save huge files.

When you're through with a session, you can save your RAM disk's contents back to a floppy by running `COPYDISK` again. Don't forget — I lost a program I was working on because I did a cold start before backing up to a floppy. Even that was no disaster, because a cold start clears only the normal 64K "shadow" RAM, preserving your RAM disk. Reloading and executing the control program restores the RAM drive, and if you haven't `DSKINI`ed them, your files are still there, untouched! Saved the day for me.

Danosoft's *Big RAMDisk* is a thoroughly useful utility that combines a great product with the ease of use that marks a winner. The documentation is deceptively simple for being so thorough; it left no doubts or questions in my mind after the first read-through; and if you forget something, it's easy to find on just three pages. *Big RAMDisk* is more thorough and flexible than RAM drive programs that come with some memory upgrades. At $12.95 it will also be one of the best values in your software collection. And at one granule, it's small enough to fit on your most-used disks — this just proves that good things do come in small packages.

(Danosoft, P.O. Box 124, Station A, Mississauga, ON L5A 2Z7, Canada, 416-897-0121; $12.95 U.S., $14.95 Cnd., add $2.50 S/H)

—Fred Toon

Software CoCo 1, 2 & 3

Super Backup Utilities— A Time-Saving Copier

If you're like me, the first thing you do with that brand new disk is *back it up*! For every computer user there are at least two horror-story accounts of the "trashed disk." You know, that one report you worked on for days — the one on the floppy disk you discovered in the affectionate embrace of your former favorite pet. Now, don't you wish you had made a backup of that disk?

You say with one disk drive and Disk BASIC it takes five full minutes and numerous swaps, so that the task ranks right up there with weeding the garden as your favorite pastime? Carl England's *Super Backup Utilities* won't be able to help you with your garden, but it is sure to change your mind about making those backups.

Super Backup Utilities is a single-disk set of three configuration programs written in BASIC with matching machine-language (ML) programs that perform the necessary task of keeping ole Spot out of the doghouse. The utilities are totally adjustable to just about any and all configurations of CoCo systems. Each set of BASIC and matching ML programs is based on available system memory. The 64K utility reduces a single-drive, verified, full 35-track disk backup from five minutes and seven arm-tiring disk swaps to a most acceptable three minutes, with four swaps.

Now, for those with a 128K CoCo 3 and one drive, the backup of a full 35-track disk takes two minutes with only two disk swaps. For those of us who enjoy a 512K CoCo 3 single-drive system, the entire disk is backed up with only a single disk swap and a mere two minutes of time. However, there is yet another benefit from the 512K utility.

With the 512K backup utility you have the option of making multiple copies of a disk without having to reinsert the original disk. The utility loads the entire contents of the disk into memory and holds it there until you no longer need it.

Starting with a copy of the utility disk, just run the appropriate configuration program based on the total amount of your CoCo's memory. The configuration program automatically customizes the matching ML program. After this, all you do is `LOADM` the ML utility and *voila* — instant copies. Well, maybe not that simple, but almost.

The utility presents you with a menu screen that allows you to select one of the following: 1) Make a Backup, 2) Return to DOS or 3) Change Number of Tracks to be backed up. One point must be emphasized: The source disk (the disk to be copied) must be in the drive *before* you make the selection to do a backup. This requirement holds true for the target disk as well.

The documentation provided with this package is very professionally laid out in an eight-page booklet. Each of the utilities are fully explained in easy-to-understand, non-technical language that is actually enjoyable to read. It's quite obvious that Mr. England spent a great deal of time with attention to detail in preparing his documentation. Are any other manufacturers reading this?

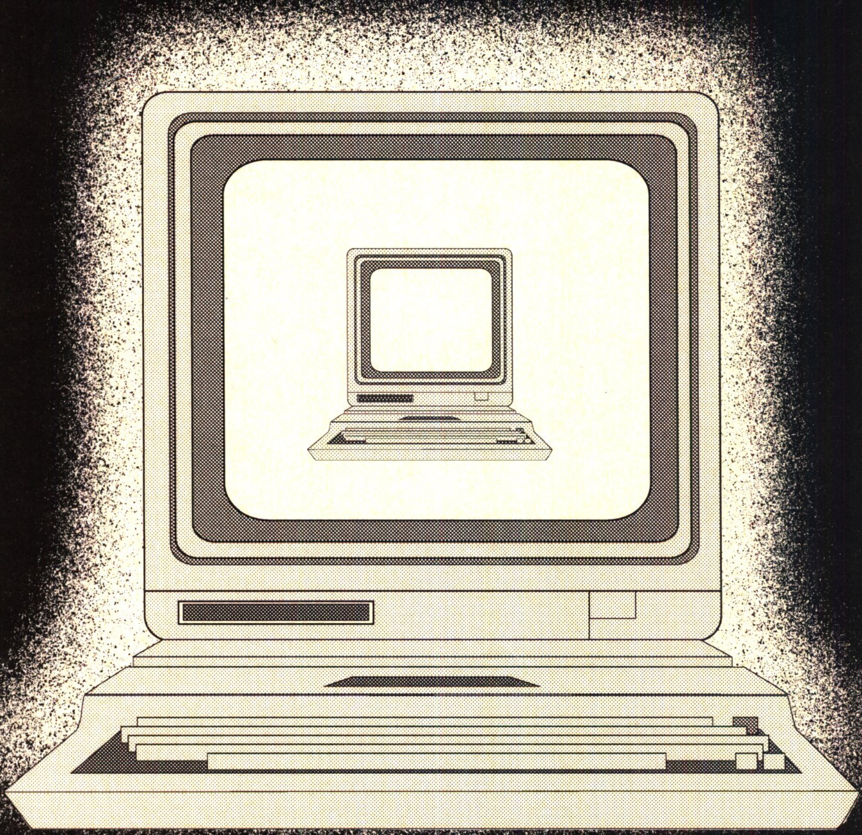
Each of the *Super Backup Utilities* programs work in the same way. They copy the disk track by track, without regard to the file allocation table. This allows for a track-by-track duplicate of the original disk. The utilities do not abort if a disk error occurs.

In the Beginning . . .

Your CoCo is the longest-lived, most innovative and, surely, best-loved Computer ever to hit the market. In constant use by millions of us for a decade now, its story is both an interesting and fascinating one. And now you can relive it all — all the fun, the people, the frustrations — in *CoCo: An Affectionate History of the Tandy Color Computer*.

This anecdotal history of the CoCo, by well-known authors Dale and Esther Puckett, tells the stories of those people at Tandy who brought us the Color Computer; the programmers who've put the 6809 through its paces; the hardware gurus with their electronic marvels; and the many vendors who have made these innovations available to us. You'll also read about people like you who have supported the Color Computer with countless hours at the keyboard and by attending CoCo functions. You never know — you might even read about yourself. And this says nothing of the many pictures you'll see.

CoCo: An Affectionate History is scheduled for release early in the fall of 1990. Prior to publication it will be available in an attractive limited-edition hardcover version for only $45. A softcover version will also be available for $15.95. But if you order now, you can reserve copies of the softcover version for a pre-publication price of just $13.50 apiece. Reserve a copy of *CoCo: An Affectionate History* for yourself. Or order several for those you care about — and take a walk down Memory Lane together.



Yes! I want to reserve: ________ hardcover copies of *CoCo: An Affectionate History* for $45.00 apiece.
________ softcover copies of *CoCo: An Affectionate History* for $13.50 (plus $2.50 S/H) apiece.

Name ______________________________
Address ______________________________
City ____________ State _____ Zip ________
Signature ______________________________

My check in the amount of ________ is enclosed.
Or, bill to: ☐ VISA ☐ MasterCard ☐ American Express
Account Number ______________________________
Expiration Date ______________________________

Mail to: CoCo History, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST.

Instead, an informative error message is displayed onscreen along with track and sector numbers where the error occurred. This allows for the additional option of recopying only the affected area of the disk using the provided ZAP utility.

You get a sector-by-sector view of the disk as it is copied. This view is provided at the top half of the monitor/TV screen while the lower half cues you for any necessary disk swaps or error information. Each backup utility allows you to alter the number of tracks to back up. I tried the 512K backup utility with *ADOS-3* and it did a beautiful job of backing up a full 40-track disk without any interference from, or with, *ADOS-3*. By the way, my *ADOS-3* is not on an EPROM — yet. Support is also provided for 80-track disks.

The ZAP utility that comes with this package is a small program offering the user the ability to copy any single sector on a disk simply by typing in the track and sector number. It could very well spell the difference between just a sharp scolding or a trip to the humane society for good ole Spot! With the ZAP utility, you no longer have to run another backup just because of one stubborn granule.

Super Backup Utilities could prove very useful to any single-drive CoCo user who finds the backup routine provided under Disk BASIC a real pain. I tried all of these utilities with a two-drive system and found a savings of almost a full 60 seconds off the Disk BASIC time on each configuration. At just $15, it's a very good deal.

(Carl England, 128 Shepherd Drive N.E., Calhoun, GA 30701, 404-629-7197; $15)

—Terry Parks

Software CoCo 3

UltraEd+— Disk-Based Assembly With the *EDTASM+* ROM Pack

If you are a person who never throws anything out because someday you will find a use for it, your day has come. Or maybe your Aunt Ginny was so excited that she finally found something you could use that you couldn't bring yourself to tell her you use only disk software. In either case, that Tandy *EDTASM+* ROM pack just increased in value.

UltraEd+ is a set of instructions and a patch for upgrading the CoCo *EDTASM+* ROM pack to work with the features of the Color Computer 3. It also adds several nice features for those of us who aren't content with BASIC and off-the-shelf solutions. It is not, on the other hand, for those of you who think CoCo assembly involves solder and funny little devices with wires.

The package makes several improvements in both *EDTASM+* and its built-in debug program, *ZBUG*. By incorporating the *SuperPatch* program published in THE RAINBOW as well as other features, *UltraEd+* adds disk support, a directory (up to four columns with Disk BASIC 2.1), support for the CoCo 3's 80-column screen, two different buffer sizes, automatic append and the ability to suppress "FCC" printing.

Disk support is provided by changing the cassette commands to access the disk drives instead. This means that the cassette files you have will need to be transferred to disk prior to using them with the patched assembler. The cassette V (verify) command is exchanged for the disk V (view directory). With Disk BASIC 2.1 this gives a four-column directory in the 80-column mode.

The L command (load) can be used to merge a number of small assembly modules into a larger program by appending each loaded file to the end of code already in memory. This allows the creation of a library of common code that can then be merged into a program when needed. Line numbers can duplicate numbers already in memory without overlaying the existing line. The N command is used to clean up any numbering conflicts.

The program supports two different buffer sizes, a 16K buffer and a larger one that will hold about 3000 lines of assembly code. These two buffers overlap and are toggled by the Q menu (which also toggles "FCC" printing and exits to BASIC). The primary benefit of having the smaller buffer is to allow testing with BASIC and Disk BASIC mapped into memory. The larger buffer, of course, allows you to have much bigger programs in memory.

ZBUG makes use of these two buffers as well. With the small buffer mapped in, debugging can be performed on code that calls the ROM routines in BASIC or Disk BASIC. Without this option, the process of debugging ROM calls is very difficult and tedious (translation: a real pain). The large buffer is used by the patches to *ZBUG* to allow for disassembly.

This disassembly feature is one of the best features of this package. It is toggled on when in the debug mode with the large buffer and disassembles any code present in that buffer. The generated code can then be edited or saved in the same manner as any other code. It is limited to about 4K at a time, but most of us will find that to be adequate. Larger modules can be handled in sections. Most important is the fact that the disassembled code reassembles (after editing origins) into exactly the same machine code. Now I can do something about bumping up the number of lives in *Downland* (for my daughter, of course).

I found very few problems with *UltraEd+*. An "End of Buffer" warning, which is documented, is one of them. Another is with the instructions for making the patch — they left out the fact that after saving *EDTASM+* to disk, a power off/on reset is probably needed before running the BASIC patch program. No combination of commands or resets seemed to be able to get around this problem. But this is not a big deal, because it occurs only in the patch process and not when using *UltraEd+*.

The documentation consists of a few pages outlining the patching process and the changes to the *EDTASM+* commands. It states that if you are a legal owner of the ROM pack, you will get the rest of the information you need from its manual. The instructions for patching the program are easy to follow and, except for the problem mentioned above, complete. The page describing the new features and their use contains the information you need but is hard to read and could stand some better examples as well as reformatting.

If you have the *EDTASM+* ROM pack, this is a good way to upgrade to a disk-based assembler for less than the cost of Tandy's Disk *EDTASM+*. If you already have the disk version, the patch provides some features not found in it. If you don't have the ROM pack already, its list price plus the cost of this package is a little higher than Disk *EDTASM+*.

UltraEd+, which is not copy-protected, requires the Tandy *EDTASM+* ROM pack, at least one disk drive, a cassette recorder with cable and a Color Computer 3 with 128K. Disk BASIC 2.1 (1.1) is preferred but 2.0 (1.0) is supported.

A special thanks to Terry Morrow of Sandbox Micro Systems in Fairborn, Ohio, for the loan of the *EDTASM+* ROM pack used in this review. I had switched to Disk *EDTASM+* and given mine away.

(Supersoft, Inc., 363 Oakwood Ave., Jackson, MI 49203, 517-787-3610; $22.50 plus $2.50 S/H)

—Jesse R. Strawbridge

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have asscertained that it is what it purports to be.

C.R.T. Connection Disk G14, one disk in a 114-disk public domain library. Disk G14 is a freeware CoCo 3 game by Shane Messer called *Color Wheel*, based on the TV game *Wheel of Fortune*. *C.R.T. Connection, 3625 Orange Ave., Fort Pierce, FL 34947, (407) 464-9873; $3.50 plus $2 S/H.*

C.R.T. Connection Disk GR25, the *McPaint* graphics editor by the Milliluk Partnership of Greg Miller and Eric Gavriluk. It includes fonts and animation features. The program is public domain/shareware, and a donation is requested. For the CoCo 1, 2 and 3, requiring 64K and a disk drive. *C.R.T. Connection, 3625 Orange Ave., Fort Pierce, FL 34947, (407) 464-9873; $3.50 plus $2 S/H.*

KJV on Disk #6, the book of Numbers, chapters 1 through 18, of the King James version of the Bible on disk in ASCII files for the CoCo 1, 2 and 3. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $3.*

Paladin's Legacy, a fantasy role-playing Adventure game featuring animated, scrolling graphics. The land of Tarinth has been overrun by vile, evil creatures who have captured the king and are running amok in the cities and villages. Only one, pure of heart, who can master the five magics of the legendary Paladin, can hope to rescue the King and restore order to the realm. The player does battle with supernatural forces and explores cities, castles and cathedrals. For the CoCo 1, 2 or 3, requiring 64K and a disk drive. It comes on a flippy disk. *Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, (412) 372-5674; $24.95 plus $2.50 S/H.*

Sinistaar, a machine-language arcade game for 512K CoCo 3s, featuring digitized voices and sound effects. When the evil Sinistaars invade the peaceful galaxy of Ursula, it falls to you, the best pilot in the galaxy, to man the ship *Marauder* and fight against them. You will mine a special ore from an asteroid belt; this ore is made into Sinibombs that destroy the Sinistaars. The game comes on two flippy disks, requiring a disk drive and a joystick (Tandy's deluxe two-button joystick recommended). *Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, (412) 372-5674; $34.95 plus $2.50 S/H.*

C.R.T. Connection Disk M1, a collection of 16 *Musica* files, along with a player. No hardware required to hear the multi-voice, machine language files. *C.R.T. Connection, 3625 Orange Ave., Fort Pierce, FL 34947, (407) 464-9873; $3.50 plus $2 S/H.*

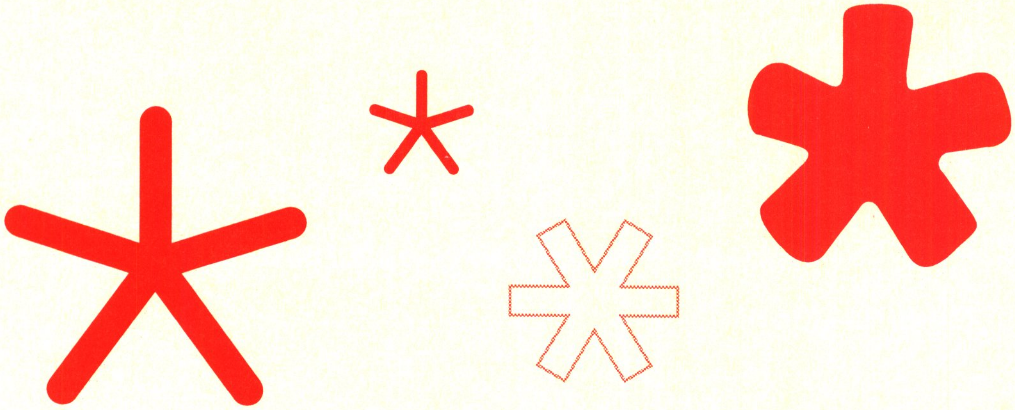
Star XB-2415 Multi-Font Printer, a 24-pin printer that does color printing. Features include three print modes (draft, letter quality and super letter quality), built-in typefaces, paper parking, an IC card slot and Epson, NEC and IBM Proprinter compatibility. Requires a serial-parallel converter or the optional serial interface for use with the CoCo. *Star Micronics, 420 Lexington Ave., #2702, New York, NY 10170, (212) 986-6770; $999.*

Supersound 1.2, an upgraded CoCo 3 sampling program that records sound in one and two tracks and also supports graphics and animation. New features include a new manual and support for up to 2 Meg of memory (as well as 128K and 512K). The package includes a play-only utility that users can give to their friends. Upgrades to Version 1.2 are provided for owners of the original version who return the original disk and the green manual cover, along with $2.50 S/H. *Supersoft, Inc., 363 Oakwood Ave., Jackson, MI 49203, (517) 787-3610; 39.95 plus $2.50 S/H.*

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examinned it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forewarded to THE RAINBOW reviewers for evaluation.

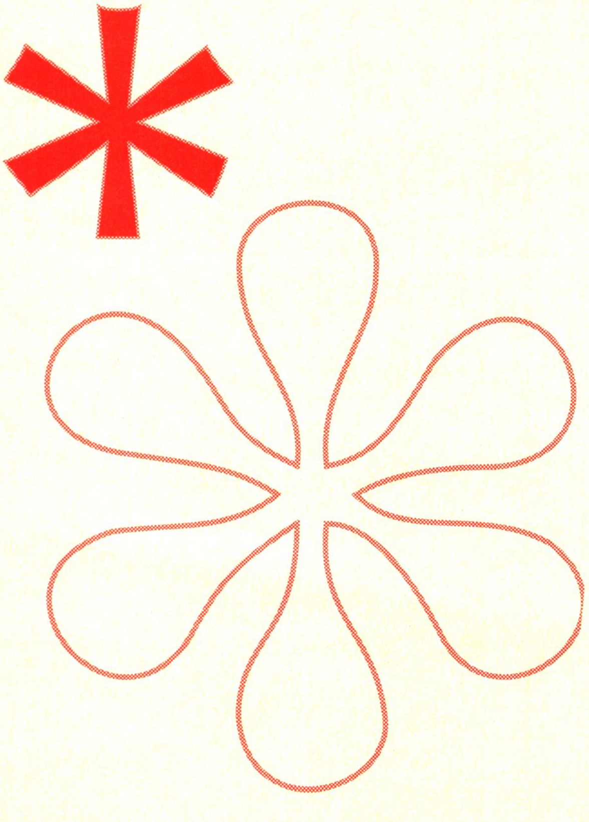
—Lauren Willoughby



A new routine for an old chore

The File Handler

by Richard Estrado



This program is especially for those who enjoyed the new experience and freedom of using wildcards to obtain selective directory listings (RAINBOW, June 1989, Page 122). However, I am sure that all disk drive users will herald the advent of this new routine. I am pleased to introduce a `COPY` command that uses wildcards to add versatility to file handling on the Color Computer.

This long-overdue utility enables you to copy groups of files from one disk to another using a one- or two-drive system. Your Tandy Color Computer 1, 2 or 3 must be equipped with Disk BASIC Version 1.1 or 2.1, at least 64K of RAM, and one or more disk drives.

The wildcard used by this program is an asterisk (*) representing the group of characters that succeed it in the filename or extension. For example `LE*.BAS` represents all the files on the disk with `LE` as the first two letters in the filename and an extension of `.BAS`. Using the same principle, `F*.*` represents all files on a disk with `F` as the first letter in the filename and with any extension.

Now that we all have an understanding of how wildcards are used, let's look at the syntax for the new `COPY` routine. When the routine is active, the `COPY` command can be used just as before for single file copies:

Richard Estrado has studied and taught computer science for the past five years at Fatima College. He may be contacted at 43 Sapphire Crescent, Diamond Vale, Diego Martin, Trinidad, West Indies.

* *

```
COPY "filename.ext:c" TO "filename.ext:d"
```

Please note that no wildcards can be used when you use the old syntax.

When you want to copy a group of files using dual drives, use the following syntax:

```
COPY "filename.ext:c" TO d
```

where *c* and *d* are numbers from 0 to 3, which represent the source and destination drives, respectively. A wildcard must be included in either the filename, the extension or both.

To copy a group of files using a single disk drive, simply use this syntax:

```
COPY "filename.ext"
```

No drive specification is necessary here since a single disk copy is being performed. But again you must include a wildcard in the filename, the extension or both. Therefore a command such as `COPY "*.BIN:0" TO 1` copies all the files on Drive 0 with the extension `.BIN` to Drive 1.

Whenever you copy a group of files, each filename copied is displayed on the screen as it is being processed. At the end of the procedure a summary of the number of files copied is printed at the bottom of the files list, and control is returned to BASIC.

How to Obtain a Working Copy

If you choose to type in the assembly language listing using *EDTASM+*, do as follows: After a successful assembly (no errors), exit from the assembler and type in the following BASIC statement:

```
SAVEM "COPY",&H5581,&H5731,&H5581
```

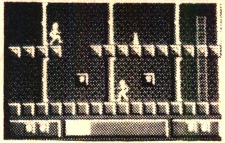
These numbers refer to the start, end and execute addresses of the code. Subsequently, whenever you want to use the routine, type in these BASIC statements:

```
CLEAR 450,&H5581:LOADM "COPY":EXEC
```

After you enter this line, a Syntax Error should occur. This indicates that after the routine was executed, control was passed to the `COPY` procedure without the correct syntax. It is not necessarily an indication that you incorrectly entered the commands. The `COPY` procedure is now active.

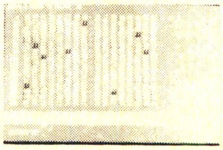
Alternatively, you can type in the BASIC program and run it, but remember that an error will occur in the last line of the program (the `EXEC` statement) for the reason stated above. Whatever method you choose, remember that it is necessary to execute the program only once. You can use the routine as many times as you want just by entering the appropriate `COPY` command.

There is one important prerequisite for all CoCo 1 and 2 users: As with the `DIR` routines, you have to put the computer into the all-RAM mode before you attempt to run `COPY`. The all-RAM program that accompanies this article also appeared on Page 97 of the July 1987 RAINBOW. ❑



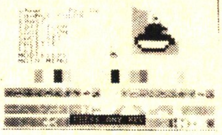
BARBARIAN QUEST

Save your bride to be from the horrors of the evil Luthor's domain! Screen after screen of beautiful graphics and exciting arcade action with fully animated characters. Great digitized sound. Walk, run, jump, climb and fight your way to victory against a host of Luthor's vile cohorts. Game includes an optional continue feature that allows you to keep playing even if you loose! Set your own level of stress! It' great arcade action! Requires 512K and 1 disk drive. ONLY $34



THE SUPER DISK

Never before have so many powerful disk utilities been assembled in one package. The manual contains NEVER BEFORE PUBLISHED information about copy protection techniques and the disk has ALL of the utilities you need to use that information. If you are an author, this is a MUST HAVE package! If you just like to SNOOP, this disk has everything you need to read & write any part of a disk, even the data you were not meant to see! If you want to create copy protected disks or copy your valuable originals, THE SUPER DISK is for you! JUST $39



WARGAME DESIGNER II

WGD II is a complete graphic oriented war game design system. Create your own graphic icons for units and terrain features. Design your own maps. Assign each unit it's own unique attributes. Then play the games you want to, the ones YOU designed. It's easy. All modules are menu driven, no programing knowledge required. Comes complete with manual, 2 flippy disks and 4 ready to play scenarios. ONLY $29

WARGAME DESIGNER ICON DISK

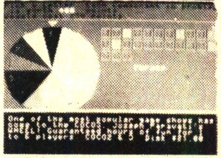
This disk contains hundreds of ready to use icons for units and terrain features. Save hours of design time. Just transfer these icons to your WGD II game disk (automatically from menu) and you're ready to design a new scenario. A real bargain at just $15

WEEKLY WINNER 3.0

Recently updated, WW 3.0 now handles 3,4,5,6 and 7 digit lottos. We've personally seen it pick 4 and 5 out of 6 in the Ohio SUPER LOTTO and have had reports of winnings from users in other parts of the US. Enhance YOUR chance! Invest in WEEKLY WINNER 3 today ONLY $15

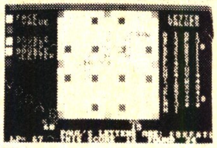
COCO 3 FLAGS

This is the BEST "RISK" play alike available for the COCO 3. Screen shows the entire world and zooms in on the area you choose. For 1 to 6 players. It's great entertainment for a mere $21



COCO 3 WHEEL

Outstanding party fun of 1 to 6 players! You can even design your own word puzzles. ONLY $21



VOCAB

If you like SCRABBLE, you'll love VOCAB. It even includes a family of computer opponents. For 1 to 6 players. JUST $21

1990 CATALOG

Have you got your copy of our NEW 1990 fully illustrated 16 page catalog yet? It explains in full detail each of the programs above plus many more fine entertainment and productivity programs for your COCO 3 disk system. Send your name and address and $2.00 and we'll RUSH your copy to you at once. You'll also get DISCOUNT COUPONS worth $30.00 FREE with the catalog! Get your's Today.

All orders are shipped via first class mail within 24 hours of receipt. We accept VISA, MASTERCARD, MONEY ORDERS, PERSONAL CHECKS and COD orders.
COD's add $3.00. Phone or mail your order in today!

SPORTSware
1251 South Reynolds Road, Suite 414 • Toledo, Ohio 43615
(419) 389-1515

64K Disk

Listing 1: COPYASM

```
00010 *      USING WILDCARDS
00020 *
00030 *   BY  RICHARD ESTRADO
00040 *       ON 89-10-27
00050 *
00060 *
00070 START   CLRA
00080         LDX     #COPY
00090         STX     $C211
00100 COPY    LBSR    $C935
00110         CLR     UCOUNT
00120         CLR     TCOUNT
00130         CLR     DRIVE
00140         CLR     SDCF
00150         LDA     $EB
00160         STA     SDRIVE
00170         STA     DRIVE
00180
00190         LDY     #$094C
00200 LOOK    LDA     ,Y+
00210         CMPA    #'*
00220         BEQ     GTPARM
00230         CMPY    #$0957
00240         BNE     LOOK
00250         LBRA    $D3BC
00260 GTPARM  CLRA
00270         CLRB
00280         JSR     $A5
00290         BEQ     SKIP
00300         CLRA
00310         COMA
00320         STA     SDCF
00330         LDB     #$A5
00340         JSR     $B26F
00350         JSR     $A5
00360         SUBB    #2
00370         SUBA    #'0
00380         LBLO    END
00390         CMPA    #3
00400         LBHI    END
00410         STA     DRIVE
00420         JSR     $9F
00430 SKIP    JSR     $A5C7
00440 EXTRAC  LDX     #TABLE
00450         STX     PLACE
00460 SETUP   JSR     $C79D
00470         JSR     $B958
00480         LDD     #$1102
00490         STA     $00EC
00500         STB     $EA
00510         LDB     #3
00520 STORE   STB     $ED
00530         LDX     #$600
00540         STX     $EE
00550         JSR     $D6F2
00560 COMP    TFR     X,U
00570         LDA     ,X
00580         BEQ     ADVAN
00590         COMA
00600         LBEQ    GETNAM
00610 * COMPARE THE FILE NAME
00620 SERCH1  LDY     #$094C
00630 COMP1   LDA     ,Y
00640         CMPA    #'*
00650         LBEQ    SERCH2
00660         CMPA    ,U+
00670         BNE     ADVAN
00680         CMPY    #$953
00690         BEQ     SERCH2
00700         LEAY    1,Y
00710         JMP     COMP1
00720 SERCH2  LEAX    8,X
00730         TFR     X,U
00740         LDY     #$954
00750 COMP2   LDA     ,Y
00760         CMPA    #'*
00770         LBEQ    DUMP
00780         CMPA    ,U+
00790         BEQ     COMP3
00800         LEAX    -8,X
00810         BRA     ADVAN
00820 COMP3   CMPY    #$956
00830         BNE     NEXT
00840         BRA     DUMP
00850 NEXT    LEAY    1,Y
00860         JMP     COMP2
00870 *  ADVANCE THE DIR POINTER
00880 ADVAN   LEAX    32,X
00890         CMPX    #$700
00900         BNE     COMP
00910         INCB
00920         CMPB    #11
00930         BLS     STORE
00940         RTS
00950 * DUMP THE FILE NAME TO BUFFER
00960 DUMP    LEAX    -8,X
00970         PSHS    B
00980         PSHS    X
00990         PSHS    Y
01000         LDB     #12
01010         LDY     PLACE
01020 REP     DECB
01030         CMPB    #0
01040         BEQ     QUIT
01050         LDA     ,X+
01060         STA     ,Y+
01070         BRA     REP
01080 QUIT    STY     PLACE
01090         PULS    Y
01100         PULS    X
01110         PULS    B
01120         BRA     ADVAN
01130 * PERFORM THE REPEATED COPY
01140 GETNAM  LDX     #TABLE
01150         STX     PLACE2
01160 LOOP    LDY     PLACE2
01170         CMPY    PLACE
01180         BEQ     SUMARY
01190         LDX     #$094C
01200 LOAD    LDA     ,Y+
01210         STA     ,X+
01220         CMPX    #$0957
01230         BNE     LOAD
01240         STY     PLACE2
01250         JSR     OUTNAM
01260         LDA     UCOUNT
01270         CMPA    #10
01280         BNE     UNIT
01290 TEN     INC     TCOUNT
01300         CLR     UCOUNT
01310 UNIT    INC     UCOUNT
01320         JSR     COFI
01330         LDA     SDCF
01340         BNE     REPT
01350         JSR     $D326
01360 REPT    JMP     LOOP
01370 COFI    LDA     SDRIVE
01380         STA     $EB
01390         LBSR    $D399
01400         LDA     SDCF
01410         PSHS    A
01420         LDA     DRIVE
01430         STA     $EB
01440         LBSR    $D399
01450         JSR     $CAE9
01460         LBRA    $D3D6
01470 * OUTPUT COPIED FILENAME
01480 OUTNAM  LDX     #$094C
01490         LDB     #8
01500         JSR     $B9A2
01510         LDA     #32
01520         JSR     [$A002]
01530         LDB     #3
01540         JSR     $B9A2
01550         LDA     #13
01560         JSR     [$A002]
01570         RTS
01580 MSG     FCC     "FILE(S) COPIED!"
01590 SUMARY  LDX     #MSG
01600         LDA     #13
01610         JSR     [$A002]
01620         LDA     TCOUNT
01630         ADDA    #$30
01640         JSR     [$A002]
01650         CLR     TCOUNT
01660         LDA     UCOUNT
01670         ADDA    #$30
01680         JSR     [$A002]
01690         CLR     UCOUNT
01700         LDA     #'
01710         JSR     [$A002]
01720         LDB     #16
01730 PRT     LDA     ,X+
01740         JSR     [$A002]
01750         DECB
01760         CMPB    #0
01770         BNE     PRT
01780 END     RTS
01790 TABLE   RMB     748
01800 PLACE   RMB     2
01810 PLACE2  RMB     2
01820 DRIVE   RMB     1
01830 SDRIVE  RMB     1
01840 SDCF    RMB     1
01850 UCOUNT  RMB     1
01860 TCOUNT  RMB     1
01870         END
```

Conversions and Diversions

by Greg Law
Technical Editor

Have you stumbled across the `rma` assembler and wondered just how it differs from the standard assembler? Judging by the letters I have received, quite a number of you have. The `rma` assembler is included with the C compiler under the name `c.asm`, and an updated version is included with the OS-9 *Development System*. The primary difference is that `asm` is designed to assemble system modules and utilities, whereas `rma` is designed for high-level language support and large applications programs.

Put another way, `asm` requires all source code to be assembled at once as a single file. Although you can put the source code into separate files for easier editing, the files must be either merged into a single file or merged at the assembly step using the `use` directive. This places a limitation on the file size that may be assembled as well as the number of labels that may be used. This also means that any function in any of the files may call any other function and directly manipulate any variable in the data area, whether by accident or otherwise.

In addition to being OS-9 Online SIGop, Greg Law enjoys programming on all types of computers and has worked on systems ranging from the CoCo to the Burroughs B6700 super mainframe. He lives in Louisville, Kentucky.

One advantage of `rma` is that the source code may be contained in any number of files, and only one file needs to be assembled at a time. For example, if you are developing an application and modify only one file, there is no need to assemble any of the other source files. You can simply assemble the modified file and link it with the other object files to create the executable program. Another advantage of `rma` is that, by default, all labels are local to the `psect` in which they are defined. This means that no function can call any other functions or manipulate any variables that are defined in other files unless you explicitly allow it to do so by making the label global. This might not make you a better programmer overnight, but it allows greater flexibility in creating modular code.

One of the disadvantages of `rma` is that, unlike `asm`, it does not give you control over the exact byte placement of data and code. The linker allocates space for your symbols on a first-come, first-served basis, and the offset given to a label can vary depending upon the order in which the files are linked. Normally you don't need explicit byte placement, so this isn't a major concern. However, there are certain instances where this can be an important factor, such as when writing device descriptors.

Converting Source

The process of converting `asm` source code to `rma` source isn't difficult at all. As you browse over the listing of `nice`, you will see that most of it is the same as the listing shown last month. The first modification is to add a few equates for those without the `os9defs.a` file. Note that we have removed the `rmb 200` statements for the stack and parameters and placed them into the equates section. This is done because the memory size required for the stack is defined in the `psect` statement.

The `mod` statement is changed to a `psect` that defines the beginning of the program code section. The variables defined here include the name, module type and language, attributes and revision level, edition, stack size, and the entry point for the program. Note that the name is the actual string itself and not a label referencing a string. Each source file should have only one `psect`, and only the source file with the actual entry point of the program defines all fields. All other source files should contain zero for all fields except the name, edition and stack requirements. The primary difference here is that the definitions in the `psect` are used to define the object file header used by the linker and do not have any direct relation to the module header.

The `vsect` statement defines the beginning of the variables section. The variables are defined in almost exactly the same manner as with `asm`, with one minor difference — the statement `dsiz equ .` has been replaced with an `ends` statement, which is shorthand for `endsect`. This defines the end of the data section, and `rma` automatically calculates the number of bytes required. Also, it is mandatory that the `vsect` be placed inside the `psect`. You can have any number of `vsects` within a `psect`, but you can have only one `psect` per source file.

The remainder of the source file is exactly the same, except that `len equ *` has been replaced with an `ends` statement. As above, this defines the end of the `psect`, and `rma` automatically calculates the code size generated for you. The secret formula here is that the `endsect` statement defines the end of a section much the same as `ENDIF` works with nested `IF` statements in BASIC09. As you have seen, converting source code from `asm` to `rma` is relatively painless for small source files.

Programming Principles

For larger files you will probably want to split the source into multiple files, with each file containing a logical unit. For example, in the listing shown, the ASCII-to-hexadecimal conversion routine can be put into a separate `psect` since it can be considered a separate entity from the mainline code. The idea here is to create your programs as a sequence of subroutines with explicit entry and exit conditions much the same as a library. Indeed, it is much easier to write and debug a routine to put characters on the screen and perform screen scrolling operations than it is to write an entire word processor from scratch.

With this technique you can quickly and easily create the routines used by the application as you gradually build up to the master program. Later on, these same routines can be reused in many other applications such as a relational database, terminal emulator, etc. A common mistake is to sit down with a large application in mind and attempt to write it from scratch without giving much thought to the underlying procedures that are required.

It should be mentioned that `rma` is well-suited for this type of programming. It allows you the flexibility to create the subroutines as separate modules. You can assemble each file as you modify it, then link it with mainline code that will test the routine as necessary. There is no need to reassemble every module because one routine was altered, as is the case with `asm`.

Another bonus is that the screen updating routine doesn't need to concern itself with the variables used in the other routines. With `rma` you can declare the variables used in each routine within its `psect`, and they will be hidden from any other routines. You will quickly realize that modular code is definitely easier to create and maintain. ❑

Listing 1: `nice.a`

```
**************************************************
*
* NICE  -  (C)1989 by STEPHEN B. GOLDBERG
*
* Use: nice [priority] <command> [parameters]
*
* Run a command at the indicated priority (1-255)
* If the priority is omitted it defaults to 100
*
          ifp1
          use   /dd/defs/os9defs.a
          endc
*
prgrm     equ   $10        module type
objct     equ   $01        language
reent     equ   $80
rev       equ   1          revision number
edition   equ   1          edition number
stack     equ   200
params    equ   200
*
         psect nice,prgrm+objct,reent+rev,edition,stack+params,entry
*
          vsect
priority  rmb   1          process priority
npoint    rmb   2          command name address
ppoint    rmb   2          command parameter address
          ends
*
          fcc   /(c)1989 S.B.Goldberg/
******************************
* CONVERT DECIMAL TO BINARY
******************************
bin       clra
          sta   priority   zero priority
          bsr   bin2       convert digits
bin2      bsr   convert    convert digits
convert   ldb   ,x         get character
          subb  #'0        make binary
          cmpb  #9         valid digit?
          bhi   back       no, return
          pshs  d          save it
          ldb   priority   get previous total
          lda   #10        multiply by 10
          mul
          addd  ,s++       add current digit
          tsta             more than 255?
          bne   syntax     yes, prompt and quit
          stb   priority   save total
          leax  1,x        bump pointer
back      rts              return
******************************
* INITIALIZE
******************************
entry     bsr   bin        get priority
findcmd   lda   ,x+        parameter character
          cmpa  #$20       command name?
          beq   findcmd    not yet, look again
          blo   syntax     no command, prompt and quit
          leax  -1,x       reset pointer
          stx   npoint     save command name address
endloop   ldd   ,x+        command name character
          cmpb  #$20       end of command name?
          bhi   endloop    no, keep looking
          ora   #$80       set ms bit
          sta   ,-x        terminate command name
findpram  ldd   ,x+        get character
          cmpb  #$20       command parameter?
          beq   findpram   no, keep looking
          stx   ppoint     save parameter address
******************************
* SET PRIORITY
```

```
*******************************
          os9    F$ID        get process ID
          bcs    out         exit with error
          ldb    priority    priority?
          bne    setprior    yes, set it
          ldb    #100        no, use 100
setprior  os9    F$SPrior    set priority
          bcs    out         exit with error
*******************************
* EXECUTE THE COMMAND
*******************************
          ldx    npoint      command name
          ldy    #200        maximum parameter length
          ldd    #$0003      type/lang and data size
          leas   200,u       move stack to direct page
          ldu    ppoint      parameter address
          os9    F$Chain     chain command
*******************************
* SYNTAX ERROR PROMPT
*******************************
syntax    leax   <sprompt,pcr syntax prompt
print     ldy    #200        maximum length
          lda    #2          standard error path
          os9    I$WritLn    prompt to screen
          bcs    out         exit with error
          clrb               clear error
out       os9    F$Exit      quit
*
sprompt   fcc    /Use: nice [priority] <command> [parameters]/
          fdb    $070a
          fcc    /     priority = 1 - 255/
          fcb    $0d
*
          ends
          end
```

Nearly 200 Color Computer Software Titles!

Call today to get your new 1990 Express Order Software Buyer's Guide. Choose from popular games, educational packages, productivity software and more. It's the fast and easy way to get the software you really want.

EXPRESS ORDER℠
A DIVISION OF TANDY CORPORATION

1-800-321-3133

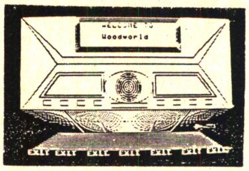
COMPUTER ISLAND EDUCATIONAL SOFTWARE
PROGRAMS ON SALE THIS MONTH
$15 each-tape or disk

First Games (for young children)
Arrow Games (for young children)
Beyond Words - Grade 3-5
Beyond Words - Grade 6-8
Beyond Words - Grade 9-12
Vocabulary Builders - Grade 3-5
Vocabulary Builders - Grade 6-8
Vocabulary Builders - Grade 9-12
Cocowheel of Fortune-For Coco 2
Cocowheel of Fortune- for the Coco 3 with RGB OR TV
Math Invaders
Number Sequences
Signed Numbers

COMPUTER ISLAND
227 Hampton Green
Staten Island,NY 10312
(718) 948-2748

Add $1.00 postage, NY res. add tax
VISA, MC - Send for free catalog

TAZMAN



RAINBOW CERTIFICATION SEAL

Soar through the universe with an old ship and a small cargo, searching for inhabited planets on which to market your goods. Shop for the latest and most efficient upgrades for your ship. Stay clear of space hazards and sidestep planetary storms as you seek your fortune among the stars!
512K CoCo3, OS-9/II & One Drive 16 Colors Joystick $24.95

RAINBOW CERTIFICATION SEAL
Armchair Admiral
The time-honored game of Battleship, enhanced by intelligent computer opponents, comes to your CoCo3 complete with sloops and galleons. Up to 8 players, any mix of human or computer.
128K CoCo3, Tape or Disk $14.95

Riddle of the Ring
Text adventure
Games Pack 1
Concentration, Hangman & others
RAINBOW CERTIFICATION SEAL
CoCo2/CoCo3
1 Drive
$10.00 each

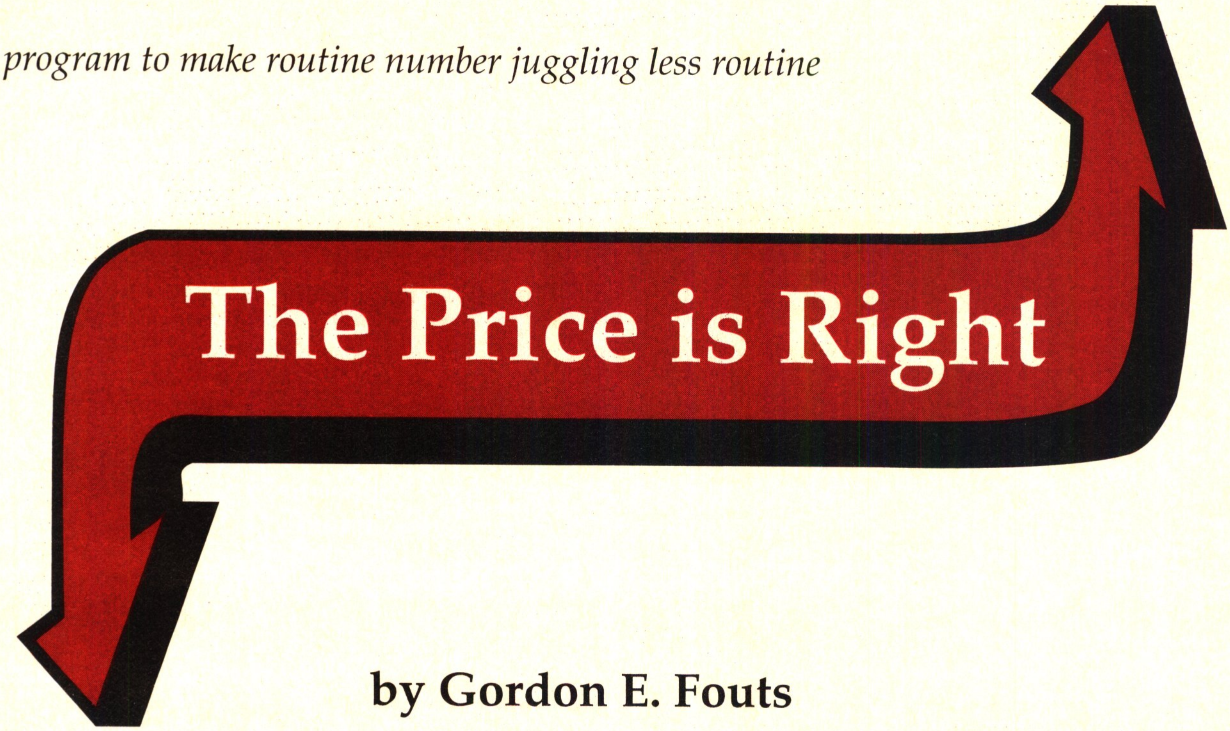
SPECIAL OFFER
Buy Tazman & Armchair Admiral and get a free T-shirt! State design and size. (Tazman/Armchair) (S M L XL) Additional shirts $10.00 each.

Checks, money orders, MasterCard & Visa.
All orders add $2.00 shipping and handling.
C.O.D. please add an additional $2.00.
Washington addresses add 7.5% Sales Tax.

Eversoft Games Ltd
P.O. Box 3354
Arlington, Wa 98223

(206) 653-5263
10am to 6pm PST
MasterCard VISA

A program to make routine number juggling less routine



The Price is Right

by Gordon E. Fouts

Recently I had a need to mark down four pages of prices for musical instruments. A calculator would have worked fine, but this seemed to be a job for CoCo. Just load *Markup/Discount*, turn on your line printer (the little TP-10 is great for this job), and type in each number as it is requested.

First the program asks whether you want to mark up or discount numbers (prices or whatever). This is followed by the question `ARE YOU SURE?`, asking you to verify your input with a Y (yes) or N (no). Press the appropriate response and then press ENTER. Next the program asks for the percentage of increase or decrease and instructs you to type it as a decimal (`4%=.04` and `40%=.40`). Let's say you want to discount prices by 30 percent (.30). After you enter this value and respond to another `ARE YOU SURE?`, the printer writes `DISCOUNTING BY ---.3`. Here you will have reached the heart of *Markup/Discount*.

Either routine — mark-up or discount — repeats over and over as many times as you have numbers to change (remember my four pages of prices?). You are asked to input your numbers one by one in response to `DISCOUNTING WHAT AMOUNT?`. If you input `100`, for example, the screen displays:

```
DISCOUNT FROM  100
DISCOUNT PERCENTAGE      .3
AMOUNT OF DISCOUNT      30
NEW REDUCED AMOUNT      70

HIT ANY KEY TO GO ON
```

and the printer gives you `100 --- 30 = 70`. If you ask to mark up numbers by 30 percent (.3), the screen displays:

```
MARK-UP FROM   100
MARK-UP PERCENTAGE       .3
AMOUNT OF MARK-UP       30
NEW MARKED-UP AMOUNT    130

HIT ANY KEY TO GO ON
```

and the printer produces `100 +++ 30 = 130`. The screen instructs you to input four zeros and press ENTER if you want to quit the present function in order to go to the other routine.

The introductory graphics require extended BASIC, but the working part of the program uses only text screens. Just start the program by typing `RUN270` and press ENTER if you have standard BASIC. Or if you want, simply delete lines 60 through 260.

Markup/Discount is a simple and handy tool to take the negative out of routine number juggling and even make it fun. ❑

Gordon Fouts, a free-lance musician who works at a music store, also operates a word processing service with his wife. He may be contacted at 3469 St. Albans Road, Cleveland Heights, OH 44121.

CoCo 3

90	255
220	191
310	48
390	14
450	127
540	59
600	88
670	184
740	45
820	25
890	241
END	231

The Listing: `MARKUP`

```
0 ‘ COPYRIGHT 1990 FALSOFT, INC
10 ‘MARK-UP +-+-+ DISCOUNT’
20 ‘BY GORDON E. FOUTS’
30 ‘THIS PROGRAM WAS WRITTEN FOR
   THE TRS-80 COLOR COMPUTER’
40 ‘FOR NON-EXTENDED BASIC,
   DELETE LINES 60 THRU 260’
50 ‘FOR THE MC-10 COMPUTER
   CHANGE “PRINT#-2” TO
   “LPRINT” IN LINES: 470, 600,
     720, AND 850'
60 'GRAPHIC SCREEN (+%-)'
70 PMODE4,1:PCLS:SCREEN1,1
80 CIRCLE(100,50),11,,.75
90 FOR T=0TO1000:NEXT T
100 CIRCLE(102,45),3,,1,.25,.75
110 CIRCLE(115,24),50,,.5,.05,.3
120 FOR T=0TO1000:NEXT T
130 LINE(165,30)-(95,135),PSET
140 FOR T=0TO1000:NEXT T
150 CIRCLE(155,125),11,,.75
160 FOR T=0TO1200:NEXT T
170 FOR D=62TO97STEP1
180 LINE(50,D)-(50,D),PSET
190 NEXT D
200 FOR T=0TO700:NEXT T
210 FOR A=32TO67STEP1
220 LINE(A,79)-(A,79),PSET:NEXT
A
230 FOR T=0TO2000:NEXT T
240 FOR M=183TO218STEP1
250 LINE(M,79)-(M,79),PSET:NEXT
M
260 FOR T=0TO3000:NEXT T:PCLS
270 'MARK-UP +%- DISCOUNT'
280 CLS:FOR T=0TO1000:NEXT T
290 PRINT@134,"MARK-UP +%- DISCO
UNT"
300 FOR T=0TO1000:NEXT T
310 PRINT@224,"WHICH DO YOU WANT
 TO DO?
320 PRINT@290,"MARK-UP":PRINT@32
3,"OR"
330 INPUT"  DISCOUNT     <M/D>";
MD$
340 PRINT
350 INPUT"  ARE YOU SURE     <Y/
N>";YN$
360 IF YN$="Y"THEN380ELSE370
370 CLS:GOTO310
380 CLS:IF MD$="M"THEN390ELSE640
390 FOR T=0TO200:PRINT@106,"MARK
ING-UP":NEXT T
400 PRINT@192,"WHAT PERCENTAGE O
F MARK-UP?":PRINT
410 PRINT@258,"TYPE THE PERCENTA
GE":PRINT@290,"AS A DECIMAL":PRI
NT
420 INPUT"  - 4%=.04 - 40%=.40
 - ";MP
430 PRINT:INPUT"  ARE YOU SURE
<Y/N>";YN$
440 IF YN$="Y"THEN470ELSE450
450 CLS:GOTO400
460 'FOR MC-10 COMPUTER, CHANGE
     THE TWO "PRINT#-2"'S TO
     "LPRINT" IN THE NEXT LINE'
470 PRINT#-2,"MARKING-UP BY  +++
+ ";MP:PRINT#-2,""
480 CLS:PRINT@42,"MARKING-UP"
490 PRINT
500 PRINT"INCREASING WHAT AMOUNT
?":PRINT
510 PRINT"TYPE <0000>"
520 INPUT"AND <ENTER> TO QUIT -
- ";M:PRINT
530 IF M=0000THEN890
540 AM=M*MP:MS=M+AM
550 PRINT"MARK-UP FROM:
 ";M
560 PRINT"MARK-UP PERCENTAGE:
 ";MP
570 PRINT"AMOUNT OF MARK-UP:
 ";AM
580 PRINT"NEW MARKED-UP AMOUNT:
 ";MS
590 'FOR MC-10 COMPUTER CHANGE
    THE "PRINT#-2" TO "LPRINT"
    IN THE NEXT LINE'
600 PRINT#-2,M;"+++";AM;"="MS:M=
0:AM=0:MS=0
610 PRINT:PRINT"HIT ANY KEY TO G
O ON"
620 G$=INKEY$
630 IF G$=""THEN620ELSE480
640 FOR T=0TO200:PRINT@106,"DISC
OUNTING":NEXT T
650 PRINT@192,"WHAT PERCENTAGE O
F DISCOUNT?":PRINT
660 PRINT@258,"TYPE THE PERCENTA
GE":PRINT@290,"AS A DECIMAL":PRI
NT
670 INPUT"  - 4%=.04 - 40%=.40
 - ";DP
680 PRINT:INPUT"  ARE YOU SURE
    <Y/N>";YN$
690 IF YN$="Y"THEN720ELSE700
700 CLS:GOTO650
710 'FOR MC-10 COMPUTER CHANGE
    THE TWO "PRINT#-2"'S TO
    "LPRINT" IN THE NEXT LINE'
720 PRINT#-2,"DISCOUNTING BY  -
- ";DP:PRINT#-2,""
730 CLS:PRINT@42,"DISCOUNTING"
740 PRINT
750 PRINT"DECREASING WHAT AMOUNT
?":PRINT
760 PRINT"TYPE <0000>"
770 INPUT"AND <ENTER> TO QUIT -
- ";D:PRINT
780 IF D=0000THEN890
790 AD=D*DP:DS=D-AD
800 PRINT"DISCOUNT FROM:       "
;D
810 PRINT"DISCOUNT PERCENTAGE: "
;DP
820 PRINT"AMOUNT OF DISCOUNT:  "
;AD
830 PRINT"NEW REDUCED AMOUNT:  "
;DS
840 'FOR MC-10 COMPUTER CHANGE
    THE "PRINT#-2" TO "LPRINT"
    IN THE NEXT LINE'
850 PRINT#-2,D;"-";AD;"=";DS:D
=0:AD=0:DS=0
860 PRINT:PRINT"HIT ANY KEY TO G
O ON"
870 O$=INKEY$
880 IF O$=""THEN870ELSE730
890 CLS
900 PRINT@134,"MARK-UP +%- DISCO
UNT"
910 PRINT@290,"DO YOU WANT TO ST
ART AGAIN?"
920 PRINT:INPUT"    - <Y/N> --
    ";R$
930 IF R$="Y"THEN270ELSE940
940 CLS
950 PRINT@134,"MARK-UP +%- DISCO
UNT"
960 PRINT@320,"TO BEGIN AGAIN -
"
970 PRINT"TYPE <RUN> AND <ENTER>
"
980 PRINT:PRINT:PRINT
```

PERRY COMPUTERS
The Ideal Buy
1-800-248-3823

TANDY COMPUTERS

Tandy 1000-HX 256K 5 1/4"	549.00
Tandy 1000-SL/2 512K 3 1/2"	755.00
Tandy 1000-TL/2 640K 3 1/2"	955.00
Tandy 1100FD Portable	805.00
Tandy 1400FD Portable	1210.00
Tandy 1400HD Portable	1975.00
Tandy 2500XL 1 Meg 3 1/2"	1239.00
Tandy 4016 SX 1 Meg 3 1/2"	1495.00
Tandy 4016 DX 1 Meg 3 1/2"	2235.00
Tandy 4020-LX 1 Meg 3 1/2"	2950.00
Tandy 4025 LX 2 Meg 3 1/2"	3650.00
Tandy 4033 LX 2 Meg 3 1/2"	5049.00
Tandy 5000MC 2 Meg 1 Drive	3825.00
Tandy 5000MC 2 Meg 84 Meg	5395.00
Tandy 102 24K	435.00
Tandy Color 3 128K	155.00
WP-2 Wordprocessor	285.00
WP-100 Wordprocessor	495.00

MONITORS & CARDS

VM-5 Monochrome Green	115.00
CM-5 Color RGB	220.00
CM-11 Color RGB	315.00
Magnavox 9CM053 Color EGA	370.00
Packard Bell Monochrome TTL	89.00
Paradise Basic EGA Card	99.00

DISK DRIVES

5 1/4" External Drive 1000HX	180.00
Tandy 20 Meg Hard Card	450.00
30 Meg Hardcard	395.00
Weltec 5 1/4" for Tandy 1400	215.00
Seagate 20 Meg Drive & Card	269.00

MODEMS

Prac. Peripherals 1200B Internal	75.00
Prac. Peripherals 2400B Internal	175.00

PRINTERS

DMP-107 Dot-Matrix	210.00
DMP-133 Dot-Matrix	279.00
DMP-300 Dot-Matrix	479.00
Epson LX-810 Dot-Matrix	195.00
Epson FX-850 Dot-Matrix	365.00
Epson LQ-510 Dot-Matrix	345.00
Epson LQ-850 Dot-Matrix	585.00
Epson FX-1050 Dot-Matrix	485.00
Panaonic KX-P1180 Dot-Matrix	195.00
Panasonic KX-P1191 Dot-Matrix	265.00
Panasonic KX-P1124 Dot-Matrix	329.00

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted add 2% (minimum charge $10.00). M.C., Visa add 2%. All non defective items require return merchandise authorization. Call for RMA Number before returning. Delivery is subject to product availability. Add 1½% for shipping and handling, $5.00 minimum charge.

TM - Registered Trademark of Tandy, Epson, and IBM

Monday thru Friday 9am - 5pm EST.

PERRY COMPUTERS

124 South Main Street, Perry, MI 48872
CALL 1-517-625-4161 or TOLL-FREE
1-800-248-3823

It Strikes a Chord

by Fred B. Scerbo
Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Two months ago the CoCo took a dive into the world of music education with the listing of *Music 101*. As I predicted, there are more music programs coming down the pipeline.

This month I present *Music 102*, another educational musical program that helps new music students learn to read music.

The Program

Music 101 was designed to introduce the user to the structure of simple music theory. Before you can delve deeply into this area, you need to know basic terms such as whole note, half note, quarter note, etc. *Music 101* covers that territory quite nicely.

Now *Music 102* goes one step further. After drawing a staff with the G clef on it, the program draws a set of octave notes from C-natural to B-natural. Using our standard `PMODE1` educational screen and format from previous educational listings, each note is displayed with its identifying name.

In music theory there are some notes that can be presented in two different ways. For example, C-sharp is the same note as D-flat, yet both are drawn on the staff differently and in different line locations. (Without going into too much detail, whether you use the sharp or flat depends on what key your song is written in.) With this in mind, I have drawn both versions of each note so the user can learn all the notes on the staff.

I took accordian lessons as a child, and reading music was always difficult for me. I was one of those students who tended to play by ear. In preparing this listing I had my nephew, Christopher, draw out all the notes and positions I needed to display. I was not going to let my faulty memory cause me to leave something out.

Running the Program

If you have used any of my recent educational listings, most of this will be old hat. After the title card appears, press ENTER to see the menu.

Selection A lets you review all the material by pressing ENTER. Quiz B and Quiz C are the same, except the information requested (the note or the name) is reversed. Use the space bar to advance through the choices. Press ENTER when you have a match. If you are not correct, the screen flashes. If you are correct, the match is shown again. Pressing the @ key gives your score at any time, and pressing C allows you to continue if any tries are still left. There are a total of 17 notes to view, counting all the sharps and flats.

A Bonus

Next month, *Music 103* will show the same skill using the bass clef or F clef, which is read differently from the G clef. For more advanced students, I have changed the listing so when the time comes, you can merge the two programs and quiz all the material at once.

In the meantime, keeping the programs separate is much more logical since music education must proceed slowly at first.

Let me know if there are any topics you would like to see in future months. (A game *is* in the works!) See you next month. ☐

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

32K Extended

15	28
40	86
65	47
85	47
120	93
140	179
185	118
225	199
260	59
305	72
335	23
365	207
390	87
405	254
420	230
435	201
455	157
465	0
480	65
495	77
510	83
525	83
540	174
1000	61
END	177

The Listing: `MUSIC102`

```
1 REM***************************
2 REM* MUSIC 102:READING G CLEF*
3 REM*   COPYRIGHT (C) 1990    *
4 REM*    BY FRED B. SCERBO    *
5 REM*    60 HARDING AVENUE    *
6 REM*  NORTH ADAMS, MA 01247  *
7 REM***************************
8 CLEAR5000:XX=RND(-TIMER):NN=17
```

```
9 CLS0:PRINTSTRING$(32,220);STRI
NG$(32,204);:FORI=1TO224:READA:P
RINTCHR$(A+128);:NEXT
10 PRINTSTRING$(32,195);STRING$(
32,211);
15 PRINT@390,"    READING G CLEF
  ";
20 PRINT@422,"  BY FRED B.SCERBO
  ";:PRINT@454," COPYRIGHT (C) 1
990 ";
25 DATA61,60,60,62,60,61,48,61,,
,,62,48,62,60,60,60,61,48,61,56,
53,60,60,60,61,48,,,,,
30 DATA53,,,58,,53,,53,,,,58,48,
58,,,,,,53,,53,,,,,,,,,
35 DATA53,,,58,,53,,53,,,,58,48,
58,,,,,,53,,53,,,71,,78,76,77,68
,76,77
40 DATA53,,,58,,53,,53,,,,58,,60
,60,60,60,61,,53,,53,,,69,,74,,6
9,69,76,76
45 DATA53,,,58,,53,,53,,,,58,,,,
,,53,,53,,53,,,76,72,76,76,76,68
,76,76
50 DATA53,,,,,,53,,53,,,,58,,50,,
,,53,,53,,53,,,,49,,,,,
55 DATA60,56,,,,60,56,52,60,60,6
0,56,,60,60,60,60,60,,60,56,52,6
0,60,60,60,,,,,
60 X$=INKEY$:IFX$<>CHR$(13)THEN6
0
65 NN=NN+1:DIM P$(NN,3),A$(6),B$
(NN),C$(NN),A(NN),N(NN),B(4),C(4
),D(4),E(4),F(4),AO(NN):NN=NN-1
70 CL$="BR14BD14NR98BD10NR98BD10
NR98BD10NR98BD10NR98R14ND10U50F6
D8G18D8F10R6E8U8H4L10G4D4F4R4E4U
2"
75 FORI=1TO3:READ C(I),D(I),E(I)
,F(I):NEXT:FORI=1TO6:READA$(I):N
EXT:FORI=1TO NN:READP$(I,1),P$(I
,2):P$(I,1)=CL$+P$(I,1):NEXT
80 COLOR1,0
85 CLS:PRINT:PRINTSTRING$(32,"="
);:PRINT@102,"AN INTRODUCTION TO
":PRINT@137,"G CLEF NOTES":PRINT
@199,"A) REVIEW NOTES":PRINT@263
,"B) QUIZ NOTES":PRINT@327,"C) R
EVERSE NOTES"
90 PRINT@388,"<<<SELECT YOUR CHO
ICE>>>"
95 PRINT:PRINTSTRING$(32,"=");
100 X$=INKEY$:X=RND(-TIMER):IFX$
="A"THEN355ELSEIFX$="B"THEN105EL
SEIFX$="C"THEN1000ELSE100
105 CLS0:PMODE0,1:PCLS1
110 LINE(0,0)-(254,170),PRESET,B
115 LINE(6,4)-(122,82),PRESET,BF
120 LINE(128,4)-(248,82),PRESET,
B
125 LINE(6,86)-(122,164),PRESET,
B
130 LINE(128,86)-(248,164),PRESE
T,B
135 DRAW"BM26,188C0NU10R10NU10BR
6R10U6L10U4R10BR6NR10D4NR10D6R10
BR12BU6NE4D2F4BR6R10U6L10U4R10BR
6ND10R10D4NL10BR6NR10D6U10R10D10
BR6NR10U10R10BR6NR10D4NR10D6R10B
R10U10NL4R10D4NL10D6NL14BR6U10R1
0D4NL10D6BR6U10R10D4L10R4F6BR6E4
U2H4"
140 DATA130,6,246,80,6,86,120,16
2,130,86,246,162
145 PAINT(2,2),0,0:PCOPY1TO3
150 PMODE0,4:PCLS1
155 LINE(0,0)-(254,170),PRESET,B
F
160 LINE(8,6)-(120,80),PSET,BF
165 PCOPY4TO2:PMODE0,1:SCREEN1,1
170 DATA"BM2,8C1","BM130,8C0","B
M2,90C0","BM130,90C0","BM2,48C0"
,"BM130,48C0"
175 FORI=1TO NN
180 A(I)=RND(NN):IFN(A(I))=1THEN
180
185 N(A(I))=1:NEXTI:FORY=1TO NN:
COLOR1,0
190 FORI=2TO4
195 B(I)=RND(3)+1:IFN(B(I))=0THE
```

ALPHA SOFTWARE TECHNOLOGIES

COMM - 4

ATTENTION!!! Alpha software technologies has teamed up with COCO devices to bring you the incredible COMM - 4 port! 4 ports in one slot! That's right, up to 4 users at one time! Special pulsed IRQ line helps to prevent lockups! External IRQ line allows you to connect to an IRQ hack mod. Totally compatible 6551 technology, no special drivers needed! Comes complete with networking software that allows multiple computers to share peripherals! A must for any BBS user! A perfect match for OS9 Level II BBS! $124.95

OS9 Level II BBS Release 3.0

System comes complete and ready to run. Use the build in menus or create your own. Run your own programs or games on- line! Complete message system included. File transfer system supports Xmodem and Ymodem plus automatic validation with keyword searching! Even comes with its own terminal program free! Now includes ANSI graphics menus and editor! See board while it runs! For a DEMO call (504)649-5761 (3/12/2400 Baud). Galactic Conflict game also included!
512k OS9 Level II and RS-232 (or COMM-4) pak required .... $ 29.95

Presto - Partner

This is what you have been waiting for! Finally RAM-Resident software for your COCO 3! Runs in the background while you do other work! Includes a note-pad that does automatic number calculations, a calendar with alarm, a phone book that can auto-dial your phone, a real-time clock and much, much, more! This program will organize your entire life! 512k OS9 Level II Required (Hayes compatible modem required for auto-dial) 512k OS9 Level II Required .... $ 29.95

Level II Tools

Without the right tools OS9 is difficult...These ARE the right tools! With these great utilities anyone can use OS9 like a pro! Complete wildcard, tree and windowing commands make OS9 easy to use! If you want to start using OS9, this is what you need! If you already use OS9, these tools will save you hours of time and headaches!
25 great utilities in one package .... $ 24.95

Disk Manager Tree

This versatile utility makes your OS9 life a breeze! No more fighting with complex directory structures! No more searching for files and typing long path names! Everything is displayed using windows! Allows you to change, create, and delete directories with single keystrokes! Also allows you to copy, view and delete files just as easily! A must for the OS9 beginner. A great time saver for the experienced OS9 user. Save hours of time and headaches! 512k OS9 Level II Required .... $ 29.95

Multi - Menu

This great Multi-Vue utility allows you to easily create your own pop-down menus! No programming experience is required, because no programming is done! You will be able to run any OS9 command or program from a menu! Menu creation is super simple, super easy! Actually see the menu as it develops. A must for Multi-Vue users! Make that non Multi-Vue software run in Multi-Vue! 512k OS9 Level II and Multi-Vue required .... $ 19.95

Warp-One

Finally, a complete OS9 Level II windowing terminal program. Many features include Auto-dial & macro, X & Y modem, ANSI graphics, buffer capture, on-line timer, chat mode, windows, and much, much, more! Perfect for any BBS user! More power that you'll ever need! 512k OS9 Level II & RS-232 Pak Required .... $ 34.95

The Zapper

This wonderful utility allows you to patch anything! Patch commands directly on disk and fix CRCs automatically! Patch the OS9 Boot file! Save lost files! Fix crashed disks! One use of this program could be worth the price! 64k OS9 Level I or II required .... $ 19.95

Send check or money order to: Alpha Software Technologies, 1500 I-10 Service Rd. #61, Slidell, LA. 70461 .... (504)649-5176 (voice)
.... (504)649-5761 (BBS)

Please add $3.00 Shipping and handling, all orders shipped same day via first class mail. Most orders arrive in 2 to 3 days. COD orders add $2.50 extra.

```
N195
200 N(B(I))=0:NEXTI:FORI=1TO4:N(
I)=1:NEXT
205 B=RND(NN):IFB=A((Y))THEN205
210 C=RND(NN):IFC=B OR C=A((Y))T
HEN210
215 DRAW A$(1):DRAWP$(A(Y),1)
220 DRAW A$(B(2)):DRAWP$(B,2):DR
AWP$(B,3)
225 DRAW A$(B(3)):DRAWP$(C,2):DR
AWP$(C,3)
230 DRAW A$(B(4)):DRAWP$(A(Y),2)
:DRAWP$(A(Y),3)
235 COLOR1,0
240 Z=0
245 PMODE0,4
250 DRAW A$(1)+”C0”:DRAWP$(A(Y),
1)
255 DRAW A$(B(2))+”C1":DRAWP$(B,
2):DRAWP$(B,3)
260 DRAW A$(B(3))+”C1":DRAWP$(C,
2):DRAWP$(C,3)
265 DRAW A$(B(4))+”C1":DRAWP$(A(
Y),2):DRAWP$(A(Y),3)
270 PMODE0,1:SCREEN1,1
275 LINE(8,6)-(120,80),PSET,B
280 X$=INKEY$:IFX$=” “THEN290ELS
EIFX$=”@”THEN1010
285 COLOR1,0:LINE(8,6)-(120,80),
PRESET,B:GOTO275
290 Z=Z+1:IFZ=4THENZ=1
295 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PSET,B
300 X$=INKEY$:IFX$=” “THEN290ELS
EIFX$=CHR$(13)THEN310ELSEIFX$=”@
“THEN1010
305 COLOR1,0:LINE(C(Z),D(Z))-(E(
Z),F(Z)),PRESET,B:GOTO295
310 IFZ+1=B(4)THEN320
315 NW=NW+1:FORK=1TO5:PMODE0,4:S
CREEN1,1:SOUND10,3:PMODE0,1:SCRE
EN1,1:SOUND1,3:NEXTK:GOTO295
320 NC=NC+1:PMODE0,4:PCLS1:LINE(
0,40)-(256,126),PRESET,B:LINE(6,
44)-(124,122),PRESET,B:LINE(130,
44)-(248,122),PRESET,B:PAINT(2,4
2),0,0
325 DRAW A$(5):DRAWP$(A(Y),1)
330 DRAW A$(6):DRAWP$(A(Y),2):DR
AWP$(A(Y),3)
335 SCREEN1,1
340 X$=INKEY$:IFX$<>CHR$(13)THEN
340
345 PMODE0,1
350 PCOPY3TO1:SCREEN1,1:PCOPY2TO
4:NEXTY:GOTO1010
355 PMODE0,2:PCLS1:SCREEN1,1:LIN
E(0,40)-(256,126),PRESET,B:LINE(
6,44)-(124,122),PRESET,B:LINE(13
0,44)-(248,122),PRESET,B:PAINT(2
,42),0,0
360 FORI=1TO NN:DRAW A$(5):DRAWP
$(I,1)
365 DRAW A$(6):DRAWP$(I,2):DRAWP
$(I,3)
370 X$=INKEY$:IFX$<>CHR$(13)THEN
370
375 COLOR1,0:LINE(8,46)-(122,120
),PSET,BF:LINE(132,46)-(246,120)
,PSET,BF:NEXTI
380 RUN
385 DATA”BR64BD24NU36R4L24R2E6R6
F4D4G4L6H4BL22BU4U34E4R6F4D2G4L6
H4U2"
390 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48L8U12R8"
395 DATA”BR64BD24NU36R4L24R2E6R6
F4D4G4L6H4BL22BU4U34E4R6F4D2G4L6
H4U2BH6BL2D14BL4U14D4L4R12L4D6R4
L12BD24BR30D14BL4U14D4L4R12L4D6R
4L12"
400 DATA”BR26BD50R8U6L8U6R8BR6D1
2U6R8U6D12BR6U12R8D6NL8D6BR6U12R
8D6L8R2F6BR6U12R8D6L8BU18BL22L8U
12R8"
405 DATA”BR64BD18NU36ND2BL14E4R6
F4D4G4L6H4U2BL22BU2U36E4R6F4D4G4
L6H4U2BH6BL4D14E4U2H4BD30BR24D14
E4U2H2"
410 DATA”BR36BD50U6NR8U6R8BR6D12
R8BR7U12R8D6NL8D6BR10U12L4R8BL32
BU12R8NU12L10R2U12L2R10”
415 DATA”BR64BD18NU36ND2BL14E4R6
F4D4G4L6H4U2BL22BU2U36E4R6F4D4G4
L6H4U2"
420 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48NU12L10R2U12L2R
10”
425 DATA”BR64BD18NU36ND2BL14E4R6
F4D4G4L6H4U2BL22BU2U36E4R6F4D4G4
L6H4U2BH6BL2D14BL4U14D4L4R12L4D6
R4L12BD24BR30D14BL4U14D4L4R12L4D
6R4L12"
430 DATA”BR26BD50R8U6L8U6R8BR6D1
2U6R8U6D12BR6U12R8D6NL8D6BR6U12R
8D6L8R2F6BR6U12R8D6L8BU18BL30R8N
U12L10R2U12L2R10”
435 DATA”BR64BD14NU36R4L24R2E6R6
F4D4G4L6H4BL22BU4U34E4R6F4D2G4L6
H4U2BH6BL4D14E4U2H4BD30BR24D14E4
U2H2"
440 DATA”BR36BD50U6NR8U6R8BR6D12
R8BR7U12R8D6NL8D6BR10U12L4R8BL26
BU12L8U6NR8U6R8"
445 DATA”BR64BD14NU36R4L24R2E6R6
F4D4G4L6H4BL22BU4U34E4R6F4D2G4L6
H4U2"
450 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48L8U6NR8U6R8"
455 DATA”BR64BD8NU36ND2BL14E4R6F
4D2G4L6H4BL22BU2U36E4R6F4D4G4L6H
4U2"
460 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL56U6NR8U6R8"
465 DATA”BR64BD8NU36ND2BL14E4R6F
4D2G4L6H4BL22BU2U36E4R6F4D4G4L6H
4U2BH6BL2D14BL4U14D4L4R12L4D6R4L
12BD24BR30D14BL4U14D4L4R12L4D6R4
L12"
470 DATA”BR26BD50R8U6L8U6R8BR6D1
2U6R8U6D12BR6U12R8D6NL8D6BR6U12R
8D6L8R2F6BR6U12R8D6L8BU18BL30U6N
R8U6R8"
475 DATA”BR64BD4NU36R4L24R2E6R6F
4D4G4L6H4BL22BU4U34E4R6F4D2G4L6H
4U2BH6BL4D14E4U2H4BD30BR24D14E4U
2H2"
480 DATA”BR36BD50U6NR8U6R8BR6D12
R8BR7U12R8D6NL8D6BR10U12L4R8BL26
BU12NU6L8U12R8BD6L2"
485 DATA”BR64BD4NU36R4L24R2E6R6F
4D4G4L6H4BL22BU4U34E4R6F4D2G4L6H
4U2"
490 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48NU6L8U12R8BD6L2
“
495 DATA”BR64BD4NU36R4L24R2E6R6F
4D4G4L6H4BL22BU4U34E4R6F4D2G4L6H
4U2BH6BL2D14BL4U14D4L4R12L4D6R4L
12BD24BR30D14BL4U14D4L4R12L4D6R4
L12"
500 DATA”BR26BD50R8U6L8U6R8BR6D1
2U6R8U6D12BR6U12R8D6NL8D6BR6U12R
8D6L8R2F6BR6U12R8D6L8BU18BL22NU6
L8U12R8BD6L2"
505 DATA”BR64BU2NU32ND2BL14E4R6F
4D2G4L6H4BL22BU2U32E4R6F4G4L6H4N
L6NR18BH6BL4D14E4U2H4BD30BR24D14
E4U2H2"
510 DATA”BR36BD50U6NR8U6R8BR6D12
R8BR7U12R8D6NL8D6BR10U12L4R8BL26
BU12U12L8D6NR8D6"
515 DATA”BR64BU2NU32ND2BL14E4R6F
4D2G4L6H4BL22BU2U32E4R6F4G4L6H4N
L6R18"
520 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48U12L8D6NR8D6"
525 DATA”BR64BU2NU32ND2BL14E4R6F
4D2G4L6H4BL22BU2U32E4R6F4G4L6H4N
L6NR18BH8BL2D14BL4U14D4L4R12L4D6
R4L12BD24BR30D14BL4U14D4L4R12L4D
6R4L12"
530 DATA”BR26BD50R8U6L8U6R8BR6D1
2U6R8U6D12BR6U12R8D6NL8D6BR6U12R
8D6L8R2F6BR6U12R8D6L8BU18BL22U12
L8D6NR8D6"
535 DATA”BR64BU6NU30R4L24R2E6R6F
4D4G4L6H4BL22BU4U30E4R6F4G4NR6L6
NL8H4BH6BL4D14E4U2H4BD30BR24D14E
4U2H2"
540 DATA”BR36BD50U6NR8U6R8BR6D12
R8BR7U12R8D6NL8D6BR10U12L4R8BL26
BU12L10R2U6NR8U6L2R10D12"
545 DATA”BR64BU6NU30R4L24R2E6R6F
4D4G4L6H4BL22BU4U30E4R6F4G4NR6L6
NL8H4"
550 DATA”BR12BD50U12F12NU12BR6U1
2R8D6NL8D6BR10U12L4R8BR6D12R8NU1
2BR6U12R8D6L8R2F6BR6U12R8D6NL7D6
BR6NU12R8BU24BL48NU12L10R2U6NR8U
6L2R10”
1000 CLS0:FORI=1TO NN:TEM$=P$(I,
1):P$(I,1)=P$(I,2):P$(I,2)=TEM$:
NEXT
1005 GOTO105
1010 CLS:PRINT@101,”YOU TRIED”NC
+NW”TIMES &”:PRINT@165,”ANSWERED
“NC”CORRECTLY”
1015 PRINT@229,”WHILE DOING”NW”W
RONG.”
1020 NQ=NC+NW:IF NQ=0THEN NQ=1
1025 MS=INT(NC/NQ*100)
1030 PRINT@293,”YOUR SCORE IS”MS
“%.”
1035 PRINT@357,”ANOTHER TRY (Y/N
/C) ?”;
1040 X$=INKEY$:IFX$=”Y”THEN RUN
1045 IFX$=”N”THENCLS:END
1050 IFX$=”C” AND Y<=17 THEN270
1055 GOTO1040
```

Expanding Horizons

Take your CoCo beyond the limits of floppy diskettes — connect to DELPHI, your **complete online business and personal resource**. With your modem and a local phone call, select from tens of thousands of downloadable programs, meet friends from across the globe, or tap into the world's most comprehensive databases to expand the horizons of your CoCo.

NEWS
TRAVEL
SOFTWARE
CONFERENCE

Your Resource for Color Computers

DELPHI's special group for owners of Tandy Color Computers is supported by the people who bring you *RAINBOW* Access extensive databases where you can upload your favorite files and download programs written by other personal computer enthusiasts. Chat with other members and resident experts in Conference, use electronic mail, and post or respond to messages in Forum.

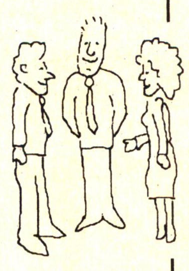
OS–9 Online

In OS–9 Online, DELPHI's interest group for fans of the OS–9 operating system, you'll meet other members, download files, and get tips to help you make the most of your CoCo.

What your CoCo was really meant for.

RAINBOW Online

DELPHI is your online connection to *RAINBOW*. You can renew your subscription, meet other Color Computer owners, order software or hardware, or inquire about products. You can even download programs published in *RAINBOW*.



Wallet-Friendly

You can access DELPHI with a local phone call from almost anywhere in the United States. There is NO extra charge for using Tymnet or Telenet, NO monthly minimum, NO premium for 1200 or 2400 bps, and connect rates are a low $7.20/hour.

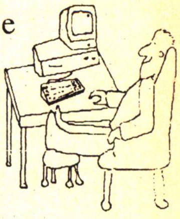
FREE Lifetime Membership

As a *RAINBOW* subscriber, you get a **FREE** lifetime DELPHI membership ($29.95 value) which includes a credit worth one evening hour of usage ($7.20).

If you don't already subscribe to *RAINBOW*, just request a subscription when you sign-up to DELPHI, and, for the $31 subscription fee, you'll get the same great deal!

Sign up now - Online!

With your CoCo and modem:



1. Dial 1-617-576-2981.*
2. Once connected, press RETURN once or twice.
3. At Username:, type **JOINDELPHI**
4. At Password:, type **RAINBOW**, if you already subscribe to *RAINBOW*.
   Type **SENDRAINBOW**, if you do not yet subscribe and wish to do so.
5. Have credit information ready.

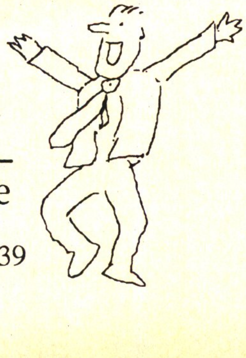
* Or call DELPHI Member Services by voice at **(800)544-4005** to obtain a local access phone number.

No Risk

With DELPHI there is no risk. You can cancel your membership within 30 days and pay only for your usage beyond the initial one-hour credit.

DELPHI

The World's Premier Online Information Service



General Videotex Corporation • Three Blackstone St • Cambridge MA 02139
800-544-4005 • 617-491-3393

An important link in the CoCo community is its ability to communicate with fellow users. If questions arise, a fresh source of information can be invaluable. We here at THE RAINBOW *have decided to create "Intercom," an information exchange point for Pen Pals, CoCo Clubs and BBSs.*

If you would like a Pen Pal or are running a CoCo Club or BBS, send us a letter including the information listed here to: The Rainbow Intercom, P.O. Box 385, Prospect, KY 40059.

Only those parties who have signed our non-piracy "agreement form" will appear in listings of Intercom. Also, please notify us if you wish to add or delete any names on this list.

Pen Pals

- I am 12 years old and would like to have a pen pal close to my age. I enjoy most games and have a CoCo 3, one disk drive and a DMP-105. I have only had my computer one year. I speak English but I can also speak French fluently.

Amy McFadden
Box 731
Cochrane, AB TOL OWO
Canada

- I am a 20-year-old graduate of John Abbot College in Montreal and am looking for pen pals of any age. I have a CoCo 1, a CoCo 2, a DMP-105 and a cassette recorder. I have been using the CoCo for eight years, and I'm interested in both BASIC and assembly language. I also enjoy good Adventure and action games.

Michael Mattsson
7 Fairwood St.
Pointe Claire, PQ H9R 2S1
Canada

- I am 13 years old and in the eighth grade. I would like a pen pal from anywhere. I own a 64K CoCo 2, an FD-502, a DMP-130A and a CCR-81 cassette recorder. I would like a person who could help me with different programs.

Heather Yurkovich
75 Chesnut St. Box 493
Ellsworth, PA 15331

- I am 15 years old and own a 64K CoCo 2, an FD-501 drive, a DMP-105 and a DCM modem. If anyone would like to be pen pals, please write. I will answer all letters.

Joe Ahern
65 Oak Road
Canton, MA 02021

- I am looking for a pen pal. I'm 13 years old. I have a CoCo 2, two disk drives, a CCR-82, a DMP-132 and a lot of games.

Daniel Collins
P.O. Box 108
Orrington, ME 04474

CoCo Clubs

ARIZONA
Tucson Color Computer Club, Bruce Smith, 3030 Mustang Dr., Tucson, 85708, (602) 747-7859

CALIFORNIA
Citrus Color Computer Club, Orville Beaver, P.O. Box 6991, San Bernardino, 92412-6991, (714) 685-6334

Color America Users Groups, Jack W. Eizenga, 3811 N. Foster Ave., Baldwin Park, 91706-3912, (818) 960-8010

Marysville\Yuba City Area CoCo Club, Jim Vestal, P.O. Box 5126, Marysville, 95901, (916) 742-5499

CONNECTICUT
Southeastern Connecticut Color Computer Users Group, Larry Donovan, 25 Stony Brook Road, Stonington, 06378, (203) 535-4211

GEORGIA
Atlanta Computer Society, Inc., Alan R. Dages, 4290 Bells Ferry Road, Suite 10639, Kennesaw, 30144, (404) 469-5111(voice), (404) 636-2991(modem)

IDAHO
Snake River Color Computer Club, Emil Franklin, 1750 Carmel Drive, Idaho Falls, 83403, (208) 522-0220

ILLINIOS
Motorola Micro Computer Club, Steve Adler, 1301 East Algonquin Road, Shaumburg, 60196, (708) 576-3044

Cook County Color Computer Club, Howard Luckey, 10 McCarthy Road, Park Forest, 60466-2122, (708) 747-0117

Chicago OS-9 Users Group, Roger C. Halvorsen, 1598 Ardmore Ave., Glendale Heights, 60139, (708) 469-8174

Starved Rock Color Computer Club, Neal Roberts, 1250 E. Bluff, Marseilles, 61341, (815) 795-4894

Quincy Color Computer Club, Steve Wellman, 1600 Highland Lane, Quincy, 62301, (217) 224-8307

IOWA
Metro Area Color Computer Club, Joe Cavallaro, 2425 Ave. A, Council Bluffs, 51501, (712) 322-2438

Mid Iowa CoCo, Terry Simons, 1328 48th, Des Moines, 50311, (515) 279-2576

LOUISIANA
The CoCo Sig, Christopher Mayeux, 20 Gibbs Drive, Chalmette, 70043, (504) 277-6880 (voice) or (504) 277-5135 (modem)

MARYLAND
Arkade, John M. Beck, 3513 Terrace Drive, #D, Suitland, 20746, (301) 423-8418

MICHIGAN
Greater Lansing Color Computer Users Group, E. Dale Knepper, P.O. Box 14114, Lansing, 48901, (517) 626-6917

NEW YORK
The Island CoCo Club, Dennis Zobel, P.O. Box 426, Massapequa, 11762

Kings Byte CoCo Club, Morty Libowitz, 1063 E. 84th St., Brooklyn, 11236, (718) 763-4233

NORTH CAROLINA
Norca Users Group, Matthew Royal, Rt. 21, Box 906, Fayetteville, 28304, (919) 484-1230

OHIO
Dayton Color Computer Users Group, Steven E. Lewis, 4230 Cordell Drive, Dayton, 45439, (513) 299-3060

Tri County Computer User Group, Ron Potter, 10914 Oliver Road, Cleveland, 44111, (216) 476-2687

PENNSYLVANIA
Cumberland Valley Users Group, Thomas Martin, 9085 Newburg Road, Newburg, 17240, (717) 423-5525

Pittsburgh Color Group, Ralph Marting, 309 Frazier Drive, Pittsburgh, 15235, (412) 823-7607

RHODE ISLAND
New England "CoCoNuts" Color Computer Club, Arthur J. Mendonca, P.O. Box 28106 North Station, Providence, 02908, (401) 272-5096(Sig3)

SOUTH CAROLINA
Spartanburg CoCo Club, Jesse W. Parris, 152 Bon Air Ave., Spartanburg, 29303, (803) 573-9881

SOUTH DAKOTA
Empire Area Color Computer Users Group of South Dakota, Carl Holt, P.O. Box 395, Brandon, 57005, (605) 582-3862

TEXAS
The Codis CoCo Symphony, William C. Garretson, 2902 Harvard St., Irving, 75062, (214) 570-0823

Mid Cities TRS-80 Users Group, Rob Yoder, P.O. Box 171566, Arlington, 76003, (817) 535-7931

VIRGINIA
Southwestern Virginia Color Computing Club, Ricky Sutphin, Route 1, Box 20, Henry, 24102, (703) 365-2018

Richmond Area Color Computer Organization, William T. Mays Jr., 6003 Westbourne Drive, Richmond, 23230, (804) 282-7778

WASHINGTON
Spokane Color Computer Club, Richard Baysinger, 2217 W. Sanson, Spokane, 99205, (509) 326-2793 or BBS#(509) 325-6787

WEST VIRGINIA
Huntington Area Color Computer Symposium, Jim Bush, P.O. Box 391, Lesage, 25537-0391, (304) 736-5314

AUSTRALIA
Australian National OS-9 Users Group, Gordon Bentzen, C/- 8 Odin Street, Sunnybank, Queensland 4109, (07)345-5141

Brisbane Southwest Colour Computer Users Group, Bob Devries, 21 Virgo St., Inala, Queensland 4077, (61)-7-3727516

CANADA
Halifax Dartmouth Color Computer Users Group, David H. Haley, Comp. #7 Greenforest Subdivision, RR#1 Lower Sackville, NS B4C 2S6, (902) 864-0454

Les CoCophiles Du Sud-Ouest, Jean Labrose, 20 Ste-Julie #A, Vaudreuil, PQ J7V 1B5, (514) 455-0486

PUERTO RICO
Puerto Rico Color Computer Club, Luis R. Martinez, P.O. Box 2072, Guaynabo, 00657-7004, (809) 799-8217 or (809) 728-2314

BBSs

State/City	BBS Name	Access Number	Parameters (Baud rate-Parity-Word Bits-Stop Bits)	SysOp
Arizona				
Peach Orchard	Communications Central BBS HST	(501)249-3814	300/19,200-N-8-1	Perry Parsons
California				
Marysville	09-Online BBS	(916)742-6809	300/1200-N-8-1	Jim Vestal
Florida				
Miami	A Little R S R	(305)266-1099	300/1200-N-8-1	Robert Jones/Robert Caraballo
Kansas				
Beloit	Kansas Konnektion BBS[1]	(913)738-5613	300/1200-N-8-1	Gary N. McCarty
Massachusetts				
Worcester	Gosub BBS	(508)756-1442	300/1200/2400-N-8-1	Richard Bostock
Minnesota				
Brainerd	Brainerd 4-Way[2]	(218)828-1144	300/1200/2400-N-8-1	Mike Lowe
New Hampshire				
Allenstown	The CoCoBean BBS	(603)485-8682	300/1200/2400-N-8-1	David Bean
New Jersey				
High Bridge	Hilltop BBS	(201)638-5698	300/1200/2400-N-8-1	Guy Silliman
Mercerville	TAO BBS	(609)587-2672	300/1200/2400-N-8-1	Bob Watson
Ohio				
Bellaire	The Phantasm BBS	(614)676-2505	300/1200/2400/9600-N-8-1	Dave Roth
Pennsylvania				
Palmer	ASCII =80=	(215)252-1608	300/1200/2400-E-7-1	Nevin Keller
Tennessee				
South Pittsburg	Base-Net BBS	(615)837-8352	300/1200/2400-N-8-1	Howard Bacon
Virginia				
Henry	Public Access[3]	(703)365-2018	300/1200-E-7-1 or N-8-1	Ricky Sutphin
Wisconsin				
Gays Mills	CoCo BBS	(608)735-4509	300/1200/2400-N-8-1	Robert & Daven Howard
Marshall	Madison Tandy Users BBS	(608)655-3806	300/1200/2400-N-8-1	Fran Selje

Notes:
[1] Kansas Konnektion BBS is up from 10 p.m. to 7 a.m.
[2] Brainerd 4-Way is up from 8 p.m. Saturday to 5 p.m. Friday
[3] Public Access is up from 12:30 a.m. to 9 a.m. Monday through Sunday

How Many Colors In a Rainbow?

Congratulations to Heidi Nelson, RAINBOW's art director, and her husband Greg on their new arrival. Their daughter Merrill was born January 25. She was 20½ inches tall and tipped the scales at 10 pounds and one ounce. Heidi's son Timmy is adjusting well to his new sister, and the whole Nelson family, though somewhat tired, is very excited. We're happy for them, too.

Needless to say, Heidi will be taking some time off to care for the baby and herself, so you may be seeing a little different look in THE RAINBOW for the next three months or so. During this time, O'Neil Arnold will be acting in Heidi's capacity. Now, O'Neil is the first to admit he is not an illustrator. But he is an artist in his own right — what he lacks with an airbrush and colored pencils, he more than makes up for with a camera and a vivid imagination. For examples of O'Neil's work, look at the photos on pages 20 and 92.

Another change we are working on is the ability to separate four-color artwork in-house. Many of you are probably wondering just what this means. I'll give you a brief overview of the color process in magazine production.

Each page in THE RAINBOW is made up of one or more pieces of photographic film. Sometimes several sheets of film are *overlaid* (placed one on top of another) to achieve the final page. The resulting films for each page are used by the printer to create a 32-page *signature* (we call this a sig but it has nothing to do with Delphi) for the magazine pages. That's right — the press prints 32 pages at one time.

In the case of black-and-white pages, this process is not too difficult. The press operator needs to use only black ink in the press. But when we put, say, a color photograph of a CoCo screen on a page, the process becomes infinitely more complicated. It would be cumbersome to provide all shades of green, purple, etc., in the press. A printing press does not contain an infinite number of colors, so colors are not printed directly. Then how are they printed?

Before a color photo or drawing can be printed, it must be separated into four primary colors to be used by the press: black, yellow, cyan (blue) and magenta (red). These four colors are combined to create any color in the rainbow and then some. For example, a given shade of green can be made using a mixture of yellow and cyan dot patterns. So what we get from the company that separates our photos is four pieces of film, each containing various dot patterns for one of the above colors. These films are combined with the other elements of the page to create films for each individual color. These *composited* films are then used to burn an image into a printing plate. Then the magazine paper is run through four presses, each printing the information on its plate in a single color whether black, yellow, cyan or magenta. The result is the color you see.

An ongoing problem with this is that having a color photo or drawing separated into its color components costs a heck of a lot of money. Very recently we began looking into various software packages, designed to work with our network and typesetting system, that will allow us to do our own color separations. Our artists are testing these packages by creating on their computers artwork that can then be printed on four-color films. The idea is that we will soon be able to create whole pages of THE RAINBOW, complete with color, electronically. As decisions are made about which packages we'll use, you'll see more and more examples of color in the magazine.

Within the last two weeks we have gained the ability to transfer a Color Computer MGE graphics file to MS-DOS, view the image, grab it from the screen, and then combine it with text to make a page. We are taking our first steps with these new time- and money-saving techniques. For this reason we have yet to develop a means of viewing other CoCo graphics formats. We also have a little work to do before we can actually separate color photographs. Still these projects are in the works, and you can expect to see the results as we try new things.

The upshot of all this is two-fold. First, I wanted to let you know what is involved with the color process in THE RAINBOW. Perhaps you'll have a new appreciation for the work involved as you see color images in THE RAINBOW and other magazines. Second, you will gain an advantage as a result of our using these techniques. Not long ago, Art Flexser of SpectroSystems suggested we use more screen shots in our feature articles. His suggestion is based on the idea that you can learn more if you can see what the program is really supposed to do. Well,that's where we are headed. And our move into the area of in-house color separations will allow us to provide this to you in a cost-effective manner.

— Cray Augsburg

XTEAM & OS-9

XTERM

OS-9 Communications program

- Menu oriented
- Upload/download Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 Pak, or PBJ 2SP Pack, Includes all drivers
- Works with standard screen, Xscreen WORDPAK or DISTO 80 column board

$49.95 with source **$89.95**

ECONOMIST

Perform economic analysis to compare different cost and income alternatives! Compute present and future Life Cycle Worths for various combinations of single, series and gradient dollar amounts. Quickly edit and recompute for sensitivity analysis! Display line graphs. Printout data and results. Pull-down menus, windows and prompts. Requires os-9 level II and Basic09.

$39.95 WITH SOURCE **$79.95**

HARDWARE

512k memory upgrade	$99.95
Ram Software Ram Disk Print Spooler Quick Backup	All three for only $19.95

*Software by ColorVenture

XWORD
OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or DISTO
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE Mail merge capabilities for XWORD

$24.95 with source **$49.95**

XSPELL OS-9 spelling checker, with 40000 word dictionaries

$39.95

XTRIO XWORD/XMERGE/XSPELL

$114.95 with source **$199.95**

XED OS-9 full screen editor

$39.95 with source **$79.95**

XDIS OS-9 disassembler

$34.95 with source **$54.95**

XDIR & XCAL Hierarchial directory, OS-9 calculator

$24.95 with source **$49.95**

THE DIRECTOR

Produces hires picture sound and color animation shows. Completely menu driven with full editing. Great for presentations and vcr's. Requires COCO III only.

$39.95

Call for package price

AND FOR RS DOS ...

SMALL BUSINESS ACCOUTING

This sales-based accounting package is designed for the non-accountant oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vender status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List.

$79.95

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory.

$59.95

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Aditional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware

$59.95

PERSONAL BOOKKEEPING 2000

Handles 45 accounts. Enters cash expenses as easily as checks. Handles 26 expense categoriesK. Menu driven and user friendly.

$39.95

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, perpares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accting package.

$59.95

ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

$59.95

MICROTECH
CONSULTANTS
INC. 1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

VISA MasterCard

Ordering Information
Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $3.50), personal checks.

(612) 633-6161

Racksellers

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA

Birmingham	Jefferson News Co.
	Little Professor Book Center
Florence	Anderson News Co.
Montgomery	Trade 'N' Books
Tuscaloosa	Turtle's Records and Tapes

ALASKA

Fairbanks	Baker and Baker Booksellers

ARIZONA

Cottonwood	A & W Graphics Co.
Flagstaff	McGaugh's Newsstand
Phoenix	Houle Books
	Little Professor Book Center
	TRI-TEK Computers
Sierra Vista	Livingston's Books
Tempe	ASU Bookstore
Tucson	Anderson News Co.
	Software, etc.

ARKANSAS

Eldorado	Howard's Newsstand
Ft. Smith	*Hot Off the Press Newsstand*
Little Rock	Anderson News Co.

CALIFORNIA

Benicia	Ryno Computer Systems
Berkeley	Dave's Smoke Shop/Lyon Ent.
	Whenlan's Smoke Shop
Hollywood	Stef-Jen, Inc.
	Universal News Agency
Los Angeles	Center Fold Newsstand
	Circus of Books (2 Locations)
	Software, etc.
Marysville	Bookland
Napa	Bookends Bookstore
Northridge	Northridge Newsstand
Oakland	DeLauer's News Agency
Rancho Murieta	Software Plus
Sacramento	Tower Magazine
San Diego	Seventh Near B
San Francisco	Booksmith
	Bookworks
	Castro Kiosk
	The Kiost on Clement
San Jose	Computer Literacy Bookshops
Santa Clara	Computer Literacy
Santa Monica	Midnight Special Bookstore
Santa Rosa	Sawyer's News, Inc.
Stockton	Harding Way News
Sunnyvale	Computer Literacy

COLORADO

Aurora	Aurora Newsstand
Boulder	Eads News & Smoke Shop
Colorado Springs	Hathaway's
	McKinzey-White Books
Delta	Roundhouse Books
Glenwood Springs	The Book Train

DELAWARE

Dover	Plaza News, Inc.
Wilmington	The Smoke Shop

DISTRICT OF COLUMBIA

Washington, D.C.	Central Periodicals
	News Room
	The News World, Inc.
	World News, Inc.

FLORIDA

Boca Raton	Bookstop
Dania	Dania News & Books
Davie	Books Unlimited
	Software Plus More
Deland	the Family Bookshop
Ft. Lauderdale	Bookstop
	Clarks Out of Town News
Gainesville	Goering Book Center
Miami	Bookstop
	Joe's News
North Miami Beach	Almar Bookstore
Orlando	Bookstop
	Phoenix Books
Pensacola	Anderson News Co.
Pinellas Park	Wolf's Newsstand
Plantation	Bookstop
Starke	Record Junction, Inc.
	Radio Shack Dealer
Sunrise	Sunny's at Sunset
Tallahassee	Anderson News Co.
West Palm Beach	Great American Book

GEORGIA

Atlanta	Border's
	U.S. News Inc.
Bremen	Bremen Electronics/Radio Shack
Clayton	Allen's Books 'N Crafts
Cornelia	Electronic Connection
Forest Park	Ellers News Center
Riverdale	Riverdale Book & News
Savannah	Home Run Video

IDAHO

Boise	Book Shelf, Inc.
Moscow	Johnson News Agency

ILLINOIS

Centralia	Books & Co., Inc.
Champaign	*Bookmark*
	Pages for All Ages, Inc.
Chicago	Parkway Drugs
	Redig's Book Market
	U.I.C. Book Store
	Book Market
	World News
E. Peoria	Books 'n Stuff
Evanston	Norris Center Bookstore
Glencoe	Rehn Heurbinger Pharmacy
Lisle	Book Nook
Lombard	Empire Periodicals
Orlando Park	Book Link, Inc.
West Frankfort	Paper Place

INDIANA

Angola	D & D Electronics
	Radio Shack
Bloomington	Book Corner
Franklin	Gallery Book Shop
Ft. Wayne	Michiana News Service
Greenwood	Community Newscenter
Indianapolis	Borders Bookshop
	Community Newsletter
	Indiana News
	Southside News
Lebanon	Gallery Book Shop
Martinsville	Radio Shack
Nappannee	Richard's K-40 Electronics

IOWA

Des Moines	Thackery's Books, Inc.

KANSAS

Leawood	Leawood Book Gallery
Liberal	CDS Ventures
Topeka	Palmer News, Inc.
Wellington	Dandy's/Radio Shack Dealer

KENTUCKY

Hopkinsville	Hobby Shop
Louisville	Hawley-Cooke Booksellers (2 Locations)

LOUISIANA

Baton Rouge	City News Stand
Lafayette	Oil Center Newsstand
New Orleans	Bookstore
	Oliver's Newsstand
	Sidney's News Stand Uptown
Slidell	The Book Shelf
	Northshore News

MAINE

Bangor	Magazines, Inc.
Brockton	Voyager Bookstore
Caribou	Radio Shack
Oxford	Books-N-Things

MARYLAND

Baltimore	Gordon's Booksellers
Gaithersburg	News 2 U

MARYLAND(con't)

Ocean City	Hazel's Books
Silver Spring	Capital Classics

MASSACHUSETTS

Boston	Eastern Newsstand
Greenfield	World Eye Bookshop
Lenox	Book Maze
Lexington	Colonial Pharmacy
Littleton	Computer Plus
Maynard	Paper Store, Inc.
Swansea	Newsbreak, Inc.

MICHIGAN

Allen Park	Book Nook, Inc.
Battle Creek	Mickey's Newsstand
Birmingham	Border's Book Shop
Durand	Robbins Electronics
E. Detroit	Book Center of E. Detroit
	Merit Book Center
Grand Rapids	Schuler Books, Inc.
Holland	Fris News Company
Interlochen	Interlochen Bookstore
Kalamazoo	The Book Raft
	Michigan News Agancy
Lansing	Readmore News Center
Lowell	Lowell Electronics
Midland	McCandless, Inc.
Mt. Clemens	Key Book Shop
Muskegon	First Edition Bookstore
	The Eight Bit Corner
Niles	Michiana News Service
Novi	Borders Bookshop
Oscoda	Readmore Book Store
Perry	Perry Computers
Pontiac	Waterford Bookshop
Portage	John Rollins Booksellers
Riverview	The Book Stop
Roseville	New Horizons Book Shop
Sterling Heights	Booklover's Shop

MINNESOTA

Blaine	Shinder's Northcourt Comm.
Burnsville	Shinder's Burnsville
Crystal	Shinder's Crystal Gallery
Edina	Shinder's Leisure Lane
Minneapolis	Baster's Books
	Shinder's (2 Locations)
Minnetonka	Shinder's Ridge Squar
Roseville	Shinder's Roseville
St. Paul	Shinder's Annex
	Shinder's Maplewood
	Shinder's St. Pauls

MISSOURI

Farmington	Ray's TV & Radio Shack
Flat River	Ray's TV & Radio Shack
Florissant	Book Brokers Unlimited
Jefferson City	Cowley Distributing
St. Louis	Book Emporium
	World News — Westport

NEBRASKA

Lincoln	Nebraska Bookstore
Omaha	Nelson News

NEVADA

Carson City	Bookcellar
Las Vegas	Hurley Electronics
	Steve's Books & Magazines

NEW HAMPSHIRE

Newington	Winebaum's Smoke Ring II
Salem	Booksmith
West Lebanon	Verham News Corp.

NEW JERSEY

Atlantic City	Atlantic City News Agency
Cliffside Park	Garden State News
Hackettstown	Bach's Drug & Surgical
Morristown	Magazines Plus
Plainsboro	Cover-to-Cover Books, Inc.

NEW MEXICO

Albuquerque	Page One Newsstand
Santa Fe	Downtown Subscription

NEW YORK

Amherst	Village Green-Buffalo Books

Buffalo	Elmwood Buffalo Books
Cortland	Reading World
Dansville	Book Den
Elmira Heights	Southern Tier News Co., Inc.
Fredonia	On Line: Computer Access Center
Hudson Falls	G.A. West & Co.
Huntington	Oscar's Bookshop
Mamaroncek	Reader's Market
New York	Barnes & Noble - Sales Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pan Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop
	Jonil Smoke
	Penn Book
	State News
	World Wide Media Services
Rochester	Microcom Software
	Tandy Users Group
	Rochester Books, Inc.
	Village Green
	World Wide News
Troy	The Book End
NORTH CAROLINA	
Cary	News Center in Cary Village
Chapel Hill	University News & Sundry
Charlotte	Omnibus
	Papers & Paperbacks
Clemmons	K & S Newsstand
Gaffney	Gaffney Bookstore
Highpoint	K & S Newsstand
Kernersville	K & S Newsstand
Lexington	Martin's News Stand
Walkertown	K & S Newsstand
Winston-Salem	Book Nook
	K & S Newsstand (3 Locations)
	Rainbow News Ltd.
OHIO	
Akron	Churchill News & Tobacco
	Manhattan Music, Inc.
Chagrin Falls	Inside Story
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoft
Cleveland	Erieview News
Columbiana	Fidelity Sound & Electronics
Columbus	Beechcraft Newsstand
	B5 Software
	Headline Newsstand
	The Newsstand
Dayton	Books & Co.
	Huber Heights Book & Card
	Miami Valley News Agency
	Wilke News
Dublin	Book Barn
	Sibert Enterprises
Fairborn	News-Readers
	Sandbox Micro Systems
	Wilke's University Shoppe
Findley	Open Book
Fremont	The Open Book
Lakewood	Lakewood International News
Miamisburg	Wilke News
Tiffin	Paper and Ink
Toledo	Owl's Bookstore
Warren	Book Nook, Inc.
Xenia	Fine Print Books
Youngstown	Plaza Book & Smoke Shop
OKLAHOMA	
Bartlesville	Betty's Book Rack
Stillwater	Caravan Books
Taklequah	Thomas Sales, Inc. dba Radio Shack
Tulsa	Steve's Book Store
OREGON	
Beaverton	Tech Books
Eugene	Libra Books - Book Mark
Newport	Sea Towne Books, Inc.
Portland	Fifth Avenue News
Salem	Capitol News Center
	Checkmate Book
PENNSYLVANIA	
Allentown	Owl Services
Altoona	Newborn Enterprises
Ambler	Ambler News Center
Feasterville	Global Books
King of Prussia	Gene's Books
Laureldale	Software Corner
Philadelphia	Popi, Inc. (2 locations)

Pittsburgh	Central Wholesale
West Chester	Chester County Book Co.
York	The Computer Center of York
	Tollgate Bookstore
RHODE ISLAND	
Newport	Bellevue News
Pawtucket	Paperbacks Plus
Warwick	Reader's Market
West Warwick	A Novel Place, Inc.
SOUTH CAROLINA	
Charleston	New Life Bookstore
Charleston Hts.	Software Haus, Inc.
Clemson	Clemson Newsstand
Columbia	Capital Newsstand
Florence	Ray's #1
Greenville	Palmetto News Co.
Spartanburg	Pic-A-Book, Inc.
	Software City
TENNESSEE	
Brentwood	Bookworld #5
Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Goodlettsville	Bookworld
Knoxville	Anderson News Co.
	Davis-Kidd Bookseller
Nashville	Bookworld (locations)
	Davis-Kidd Booksellers
	Floppy's Disc Software
	Mosko's Place
	R.M. Mills Bookstore
Smyrna	Delker Electronics
TEXAS	
Amarillo	Hastings Books & Records
Arlington	Bookstop
Austin	Bookstop
	University Co-Op
Big Spring	Poncho's News
Dallas	Bookstop
	Maxwell Books
Desoto	Maxwell Books
Elgin	The Homing Pigeon
Ft. Worth	Trinity News
Houston	Bookstop
San Antonio	Bookstop
VERMONT	
Essex Junction	Gingeric, LTD
Manchester Center	Northshire Bookstore
VIRGINIA	
Alexandria	King Street News
	MTV Central Newsstand
Falls Church	Skyline Newsstand
Franklin	The Bookhaven
Hampton	Benders
Lynchburg	Self Serve Software
Richmond	Book Gallery
	Volume 1 Bookstore
Springfield	Springfield Central
Woodbridge	Potomac Mill Central News
WASHINGTON	
Port Angeles	Port Book & News
Seattle	Bulldog News
Tacoma	O'Leary's Books
WEST VIRGINIA	
Huntington	Nick's News
Parkersburg	Valley News Service
South Charleston	Spring Hill News
WISCONSIN	
Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Green Bay	Bosse's, Inc.
Kenosha	R.K. News, Inc.
Madison	Pic A Book
	20th Century Books
	University Bookstore
Milwaukee	Schwartz Bookshop
Racine	East Side Emporium
	U-W-M Bookstore
Waukesha	Holt Variety
Wausau	Janke Book Store
AUSTRALIA	
Blaxland	Blaxland Computers
Kingsford	Paris Radio Electronics
CANADA:	
ALBERTA	
Banff	Banff Radio Shack
Bonnyville	Paul Tercier

Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound
	A.S.C. Radio Shack
Ft. Saskatchewan	Ft. Mall Radio Shack, A.S.C.
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminister	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack
BRITISH COLUMBIA	Burnaby Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
Chilliwack	Charles Parker
Coquitlam	Cody Brooks LTD
Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Langley	Langley Radio Shack
Nelson	Oliver's Books
New Westminster	Cody Books LTD
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
Squamish	Kotyk Electronics
Vancouver	Active Components
	Friendlyware Computers
	Granville Book Co.
	Siliconnections Books LTD
100 Mile House	Tip Top Radio & TV
MANITOBA	
Altona	LA Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises
NEW BRUNSWICK	
Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.
NEWFOUNDLAND	
Botwood	Seaport Elec.
Carbonear	Slade Realties
ONTARIO	
Angus	Micro Computer Services
Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV
Toronto	Gordon and Gotch
QUEBEC	
LaSalle	Messageries de Presse Benjamin
Pont. Rouge	Boutique Bruno Laroche
SASKATCHEWAN	
Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound
YUKON	
Whitehouse	H & O Holdings

Also available at all B. Dalton Booksellers, and selected Coles and W. H. Smith in Canada, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

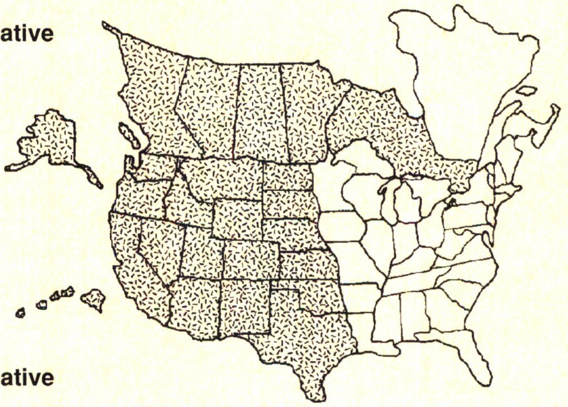
Advertisers Index

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning* THE RAINBOW *when you contact these firms.

Alpha Software Technologies	119
B & B Software	49
Burke & Burke	97
Cer-Comp, Ltd.	43
CoCo Pro	25
CoCo Gallery on Disk	18
Colorware	19
Compuserve	79
Computer Island	115
Computer Plus	3
CRC/Distro	53
Danosoft	41
Dayton Associates of W.R. Hall, Inc.	101
Delphi	121
Dr. Preble's Programs	IBC
E.Z. Friendly Software	99
Eversoft Games, Ltd	115
Federal Hill Software	55
Frank Hogg Laboratories	37
G.T.T.D. Software	47
Gimmesoft	75
Granite Computer Systems	111
Hawksoft, Inc.	77
Howard Medical	130
JR & JR Softstuff	57
JWT Enterprises	29
Kenneth Leigh Enterprises	27
Metric Industries	63
Microcom Software	7
Microcom Software	9
Microcom Software	11
Microcom Software	13
Microcom Software	15
Microcom software	17
Microdeal	BC
Microtech Consultants Inc.	125
Northern Technologies	51
NRI Schools	Insert
Oblique Triad	65
Orion Technologies	39
Owl-Ware	69
Owl-Ware	70
Owl-Ware	71
PCM	83
Perry Computers	117
Puritas Springs Software	87
r3 Systems	87
Rainbow Bookshelf	30
Rainbowfest	90
Rainbow CoCo History Book	103
Rulaford Research	47
Second City Software	129
Spectrosystems	51
SPORTSWARE	107
Sugar Software	95
Sundog Systems	IFC
Supersoft, Inc.	45
T & D Software	23
T & D Software	57
T & D Software	89
T & D Software	109
Tandy/Radio Shack	33
Tandy/Radio Shack	115
Tepco	58
True Data Products	81
Try-O-Byte	77
Wasatchware	29
Zebra Systems	61

▨ **Call:**
Belinda Kirby
Advertising Representative
(502) 228-4492

☐ **Call:**
Kim Vincent
Advertising Representative
(502) 228-4492



The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059
FAX (502) 228-5121

SECOND CITY SOFTWARE

UltiMusE III

The Ultimate Music Editor for the CoCo 3

"What if...
all CoCo music programs were this good?"

UltiMusE III is a MIDI 'Notation Sequencer'. It lets you write and edit sheet music on a 640x192 graphics screen using the mouse, play it on ANY MIDI-equipped synthesizer(s), and print out the score... Written by an experienced computer professional who is also a serious amateur musician and composer. With **UltiMusE III**, there is no more 'faking' to play what you want to hear! Perfect for the trained musician, **UltiMusE III**'s natural notation also helps a beginner to copy a favorite piece of sheet music just as it looks. Why should your music sound like a machine? **UltiMusE III** has a wide pitch range, from 4 octaves below Middle C to over 3 above. Each staff has a 4-octave range centered on one of four clefs - Treble, Guitar, Bass, and Double Bass. Staff placement, clefs, and part and MIDI channel assignments can ALL be edited... Professional software should use a professional Operating System. **UltiMusE III** uses the advanced features of OS-9 Level II and does not interfere with its windowing and king in any way.

SYSTEM REQUIREMENTS: CoCo 3 with at least 256K memory, OS-9 Level 2, Mouse or Joystick (Hi-Res Joystick Adapter recommended), Synthesizer(s) with MIDI-In jack, plus a Serial to MIDI cable. Tandy's DMP printer, a MIDI Interface Pak, and a Multi-Pak are optional equipment.

NOW FEATURING
A 32K VIRTUAL MEMORY MUSIC SCORE BUFFER

UltiMusE III
$54.95

CASIO MT-240 MIDI KEYBOARD	$149.95
A/C POWER ADAPTER	$14.95
SERIAL TO MIDI CABLE	$19.95

Newspaper Plus
FINAL EDITION

DeskTop Publishing for the CoCo 3 just got better! With the **ALL NEW NEWSPAPER PLUS - FINAL EDITION**, you can create complete and sophisticated Banners, Headlines along with Text Columns and Graphics. Bring in different pictures, fonts, fill patterns, and text from disk and create a publication with that pro-look to it. Comes complete with 22 fonts, 50 NewsArt pictures and fill patterns. 128k or 512k Disk

STILL ONLY $48.95

'FINAL EDITION' is just a news print slogan meaning the very latest published issue. In the case of Newspaper Plus - Final Edition, it means the latest upgrade is NOW available. Here are some of the added features being offered;

* Text import with Left, Right, Centered & Justification
* RamDisk Utility (512k)
* Stretch, Shrink & Compress picture utility
* A new 'Design Your Own' layout feature
* Full Font import ability
* Text to Picture wrap-around
* Disk Transfer Utility (512k)

WORD SEARCH: $22.95
A Word Search Puzzle Generator Utility program. CoCo 1,2,&3 Disk

MORSE CW: $19.95
A complete Morse Code Totorial program. CoCo 1,2,&3 Disk

SPACE RAIDERS: $16.95
A FAST ACTION ARCADE GAME. Test your skills! CoCo 1,2,&3 Disk

STARPIC UTILITY: $19.95
DMP-PIC UTILITY: $19.95
GEM-PIC UTILITY: $19.95
A complete Graphics Printing Utility program for the Star NX-1000 or Tandy's DMP or the Gemini Dot Matrix printers. Works in an easy to use Point 'N Click pull down menu environment. A MUST HAVE printing utility. CoCo 1,2,&3 Disk

Check09MV: #2.1 $25.95
Check09MV interacts with MultiVue for FAST & EASY checkbook balancing. No more waiting for your bank statement for an ending balance. Check09MV will produce a check-by-check running total of your account in an easy to use format. End those monthly surprizes! 512k

MASTER CATALOG: $19.95
MASTER CATALOG 3: $19.95
Organize your floppy disks with Master Catalog. Supports single & double sided drives, alphabetize, sort, and search & find up to 3,000 filenames. Program supports a Column Format Hard Copy and is 100% ML for lightning response. When ordering, please specify CoCo 1,2, or 3 version.

START OS-9 $32.95
An Enjoyable, Hands-On Guide To OS-9 Level 2 On The Color Computer 3. Work from a step-by-step easy to follow tutorial book and program disk. Requires 2 drives, 512K and an 80-column monitor. START OS-9...NOW NO MORE EXCUSES.

Basic Screen Editor	$19.95
A-DOS 3	$34.95
MY-DOS	$14.95
EPROM BURN SERVICE	$15.00
Ram Disk Lightning	$16.95
Printer Lightning	$16.95
BackUp lightning	$16.95
VIP Library	$149.95
VIP Writer III	$79.95
VIP Calc III	$69.95
VIP DataBase III	$69.95
OS-9 Solution	$24.95
Schematic Drafting Processor	$24.95
Tape to Disk/Disk to Tape	$19.95
Multi-Pak Crack	$24.95
TelePatch	$24.95
BlackJack Royale	$16.95
CoCo Calender Deluxe	$19.95

NewsArt A thru Z
26 disks filled with useable clip art for Newspaper Plus & Newspaper Plus - Final Edition. $100.00 for the complete set.

APBBS Ver: 3.00.00 SPECIAL INTRODUCTORY PRICE OF $39.95
QUESTION: Have you ever wondered how someone can sell and support two different BBS programs while claiming both to be the BEST? Good question you ask...we think so too!!! With the exclusive SCS commercial release of Mike Guzzi's APBBS program we end a years quest for a POWERFUL, HIGH QUALITY, and AFFORDABLE BBS program. Besides these three requirements, we also demanded full author assistance to help answer your questions and lend technical support. Mike Guzzi has not only written such a program in APBBS but has also offered his expertise and knowledge as the programmer and a SYSOP. Giving you FULL SUPPORT AFTER THE SALE! APBBS requires a CoCo3 w/512k memory, at least two double sided floppy drives (a hard drive is strongly recommended), OS-9 Level2, and RS-232 pak. APBBS is not for everyone. It is designed and intended for the SYSOP who demands performance and support.

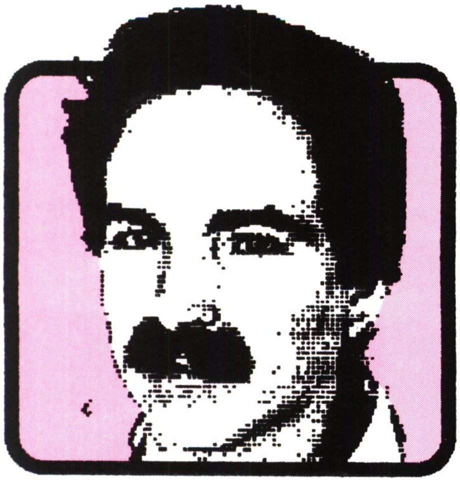
MASTER CARD - VISA
C.O.D. - MONEY ORDERS

ADD $2.50 SHIPPING
($4.50 FOREIGN) AND
AN ADDITIONAL $2.50
FOR C.O.D. ORDERS

Allow 1 to 3 weeks delivery

P.O. BOX 72956
ROSELLE, IL
60172

ORDER
708-653-5610
BBS
312-745-1387



Pyramix

This is a fascinating CoCo 3 game of skill and coordination. Pyramix is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordon Tsvetkoff and a product of ColorVenture. **Disk: $19.95**

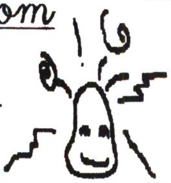
The Freedom Series

Vocal Freedom

Vocal Freedom turns your computer into a digital voice recorder. The optional Hacker's Pac lets you incorporate voices or sounds that you record into your own BASIC or ML programs. This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an automatic message minder. Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the prerecorded message directly from its Random Access Memory with amazing fidelity! You may also SAVE or LOAD sounds to and from DISK. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifier (RS cat. #277-1008) and any microphone. Will run on a CoCo 1, 2, or 3. Vocal Freedom **Disk: $34.95.** Optional Hacker's Pac **Disk: $19.95. Disk for both: $49.95**

Mental Freedom

Would your friends be impressed if your computer could read their minds? Mental Freedom uses the techniques of Biofeedback to control video game action on the screen. Telekinesis? You control the action with your thoughts and emotions. Your goal is to materialize and levitate objects with the power of your mind while avoiding the insidious cobra. Mental Freedom teaches peace of mind in the face of adversity. Mental Freedom even talks in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675. Will run on a CoCo 2 or 3 but not CoCo 1. **Disk: $24.95**



Lightning Series

These three utilities give real power to your CoCo 3.

Ramdisk Lightning

This is the best Ramdisk available. It lets you have up to 4 mechanical disk drives and 2 Ram drives on-line and is fully compatible with our Printer Lightning. **Disk: $19.95**

Printer Lightning

Load it and forget it--except for the versatility it gives you. Never wait for your printer again! Printer runs at high speed while you continue to work at the keyboard! **Disk: $19.95**

Backup Lightning

Reads your master disk once and then makes super fast multiple disk backups on all your drives! No need to format blank disks first! Supports 35, 40 or 80 track drives. This utility requires 512K. **Disk: $19.95**

COCO Braille

Produce standard grade 2 Braille on a Brother daisy wheel printer. Easy to use for sighted or blind user. No knowledge of Braille is necessary. Call for free sample. Will run on CoCo 1, 2, or 3. **Disk: $69.95**

VDOS the UnDisk

VDOS, The Undisk, ramdisk for the CoCo 1 or 2 only. Available only on **tape: $24.95**

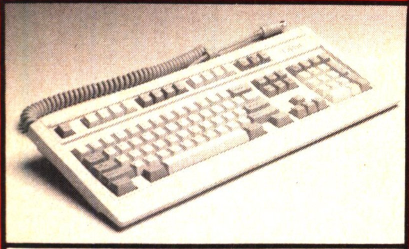
VDUMP, backup Undisk files to single tape file. Requires VDOS. **Tape: $14.95**

VPRINT, Print Undisk directory. Requires VDOS. **Tape: $9.95**

Add $2.50 shipping/ handling in USA or CANADA

Add $5.00 to ship to other countries

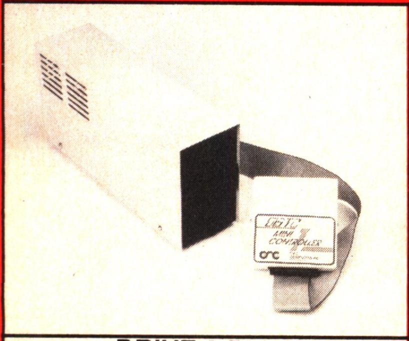
Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
24 Hour Hot Line
(502) 969-1818
Visa, MC, COD, Check



KEYBOARD

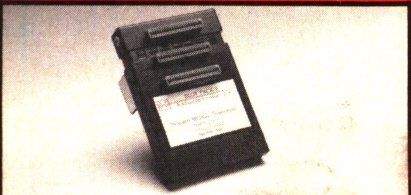
- 101 Keys with tactile touch
- coiled cable with RF filter
- can be used with Tandy or IBM and auto sensor XT or AT
- special adaptor for CoCo

KB - 1 Keyboard	$98.00
KB - ACoCo Adaptor	$49.00



DRIVE 0 PLUS

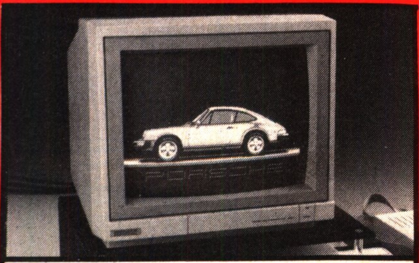
- Double sided 360K MPI 52
- Disto DC-7 controller and cable **$178.45**
- **Double Drive 0 $310** (5 ship)



SLOT-PACK II

- replacement for multipack
- 3 slots, 2 switchable
- X slot for RS-232 and modem
- middle slot can take disk controller or ROM cartridge
- 12 Volt adaptor needed for B & B and old drive controllers

MP-II	slot pack II	$89.45
AC-12	12 volt adaptor	$14.95

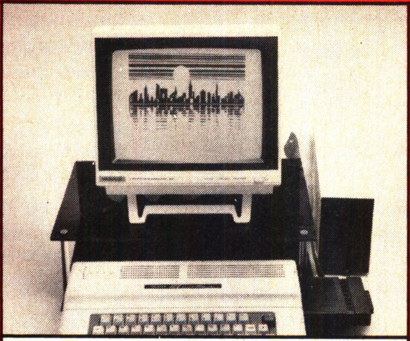


MAGNAVOX 1CM 135

- new analog with stereo sound and high grade compatible
- 640 X 240 resolution @ 12 MHz with .42 dot pitch

CC-3 RGB Cable	$19.95

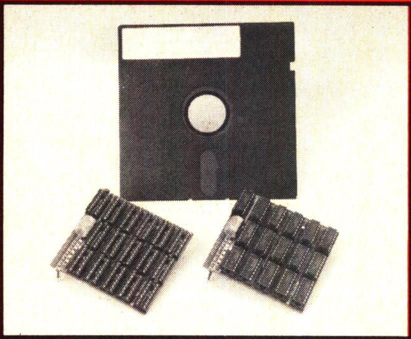
$298 ($14 ship)



MAGNAVOX 7622 AMBER OR 7652 GREEN

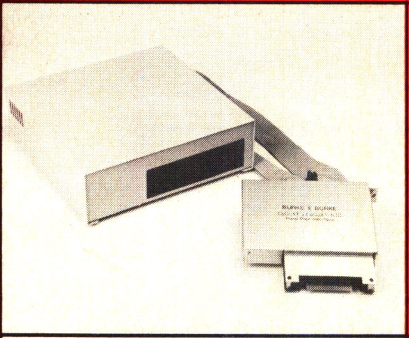
- 80 Column
- Built in Speaker

$98 (7 ship)



MEMORY

• 512K Bare Board	**$40**
• Populated 512K & Software	**$89**
• 64K 8 Chip for CoCo 2	**$30**



HARD DRIVE

20,000,000 Bytes or the equivalent to 125 R.S. 501's on line are packed into this hard drive, pre installed and ready to run. This complete easy to use package includes a Seagate 20 Meg Hard Drive, a DTC 5150 Controller and interface,* heavy duty case, power supply and fan and a 1 year warranty. This 20 meg Hard Drive will also work with Tandy and IBM clones. Basic driver, $29.95, lets you access this hard drive without need for OS-9.

See Rainbow Reviews 8/89

(9 ship)

HD-1 10 Meg**	**$349**
HD-2 20 Meg	**$499**
HD-3 30 Meg	**$549**
HD-4 40 Meg	**$598**

*Burke & Burke **reconditioned

DISTO BOX

DC-7	Mini Controller	$ 75.00
DC-3	Super Controller	$ 98.00
DC-6	No Halt Controller	$129.00
MBA-1	3 in 1 Board	$ 69.45
MEB	Mini Expansion Bus	$ 30.00
RS232	RS-232 Port	$ 49.95
DC-3C	Clock and Parallel Port	$ 40.00

PRINTERS

STARNX-1000R COLOR	$249.00
STARNX-1000II	$189.00

HOWARD BOX

VA-1	Video Converter	$ 29.45
PAL-1	Multipak Upgrade for 26-3024	$ 14.95
PAL-2	Multipak Upgrade for 26-3124	$ 14.95
RS-1	1.1 ROM Chip for Controller	$ 25.00
55BV	TEAC Floppy for 501 or 502	$ 98.00
52	MPI 360K Bare Floppy	$ 78.00
HR-2	Dual Hi-res Adapter	$ 39.45
1200HC	1200 Baud Modem	$119.00

30 Day Money Back Guarantee

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatability. If you're not happy with it for any reason, return it in 30 days and we'll give your your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.

Howard Medical Computers
1690 N. Elston
Chicago, Illinois 60622

Order Status and Inquiries
312-278-1440

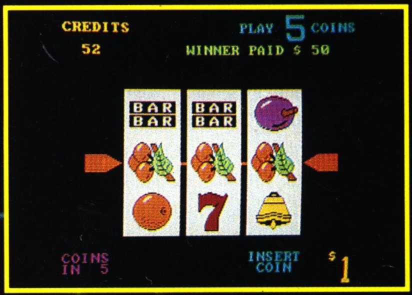
Master Card • Visa • Discover
American Express
C.O.D. • School P.O.'s

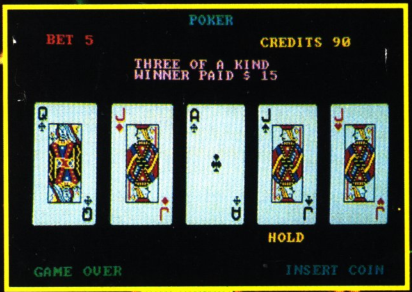
Order Line
800-443-1444

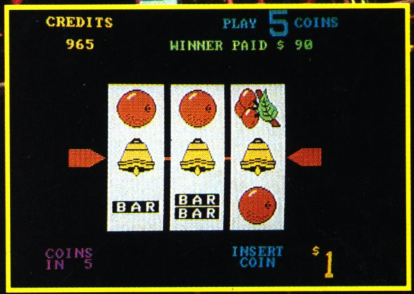
Slots & Cards

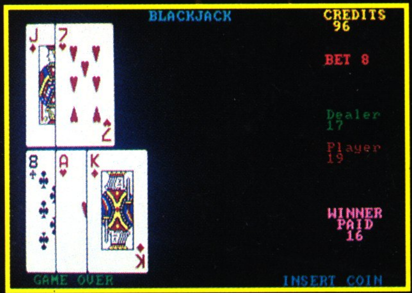
Flamingo HILTON
Flamingo
lamingo
MICKEY F
WELCOME
SHOW
SUNDAY CHAMP
10AM
$12.50 CHILD

VGA Graphics Depicted


CREDITS
52
PLAY 5 COINS
WINNER PAID $ 50
BAR BAR
BAR BAR
7
COINS IN 5
INSERT COIN
$1


POKER
BET 5
CREDITS 90
THREE OF A KIND
WINNER PAID $ 15
HOLD
GAME OVER
INSERT COIN


CREDITS
965
PLAY 5 COINS
WINNER PAID $ 90
BAR
BAR BAR
COINS IN 5
INSERT COIN
$1


BLACKJACK
CREDITS 96
BET 8
Dealer 17
Player 19
WINNER PAID 16
GAME OVER
INSERT COIN

Did you ever dream of visiting VEGAS, but you weren't sure what to expect — or if you would be able to afford it? Well, now you can play your favorite slot machine, or sit down at the blackjack table without even leaving the comfort of your home. Browse through different style slot machines (many different Multiplier slots). Visit the change booth if - or is that when? - you run out of cash, without feeling a pain in your wallet. Walk around the corner and sit down at any of a number of different style card games. Enjoy video five card draw poker - where it takes jacks or better to win. Or play Blackjack against the ever treacherous house dealer. Play Hi-Low and wager the max every chance you get. Do you like Keno? If so, choose your numbers, then sit back and wait to see if they are drawn!

All versions display vivid true to VEGAS graphics. Whatever your game, Slots & Cards has it for you! Slots & Cards is available for the IBM PC & Compatibles, Commodore Amiga, Atari ST and the CoCo III.

microdeal®

576 S. Telegraph
Pontiac, MI 48053
☎ (313) 334-5700

See your local dealer for orders and information or call us directly